ORDER NO. SD83072613C2

Service Manual

QUARTZ Synthesizer FM/AM Stereo Receiver

SA-210
[EGA]

SA-210(K)
[EGA]

Area

* [EGA] is available in F.R. Germany.

* The colors of this model included silver and black.
* The black type model is provided with (K) in the Service Manual.

Please use this manual together with the service manual for Model No. SA-210, Order No. SD83022407C8.

■ TECHNISCHE DATEN (Spezifikationen Können infolge von Verbesserungen ohne Ankündigung geändert werden.)

(DIN 45 500)

■ VERSTÄRKERTEIL

Dauerton-Ausgangsleistung bei 20 Hz ~ 20 kHz	
beide Kanäle ausgesteuert	2 × 25W (4 Ω)
	2 × 25W (8 Ω)
Dauerton-Ausgangsleistung bei 40 Hz ~ 16 kHz	
beide Kanäle ausgesteuert	2 × 25W (4 Ω)
DIN-Ausgangsleistung	2 × 25W (4 Ω)
Dauerton-Ausgangsleistung bei 1 kHz	
beide Kanäle ausgesteuert	2 × 30W (4 Ω)
	2 × 27W (8 Ω)
Gesamtklirrfaktor	
Nennleistung bei 20 Hz ~ 20 kHz	0,8% (4 Ω)
	0.5% (8 Ω)
Nennleistung bei 40 Hz ~ 16 kHz	0,8% (4 Ω)
	0,5% (8 Ω)
Nennleistung bei 1 kHz	0,8% (4 Ω)
	0,5% (8 Ω)
halbe Nennleistung bei 1 kHz	0,05% (8 Ω)
−26 dB Leistung bei 1 kHz	0,1% (4 Ω)
50 mW Leistung bei 1 kHz	0,12% (4 Ω)
Intermodulationsfaktor	
Nennleistung bei 250 Hz: 8 kHz = 4:1, 4 Ω	0,8%
Nennleistung bei 60 Hz: 7 kHz = 4:1, nach SMPTE, 8 Ω	0,5%
Leistungsbandbreite	
beide Kanäle ausgesteuert bei −3 dB	10 Hz ~ 30 kHz (4 Ω)
Dämpfungsfaktor	15 (4 Ω), 30 (8 Ω)
Eingangsempfindlichkeit und -impedanz	
Phono	2,5 mV/47 kΩ
Tape/Aux	150 mV/18 kΩ
Maximale TA-Eingangsspannung (1 kHz, eff.)	150 mV
Geräuschabstand	
Nennleistung (4 Ω)	
Phono	70 dB (nach IHF, A: 73 dB)
Tape/Aux	88 dB (nach IHF, A: 95 dB)
−26 dB Leistung (4 Ω)	
Phono	64 dB
Tape/Aux	66 dB
50 mW Leistung (4 Ω)	
Phono	62 dB
Tape/Aux	62 dB
Frequenzgang	
Phono	RIAA-Standardkurve
	±0,8 dB (30 Hz ~ 15 kHz)
Tape/Aux (Max. Lautstärke)	5 Hz ~ 70 kHz (−3 dB)
Klangregler	
Baßregler (BASS)	50 Hz, +10 dB ~ −10 dB
Höhenregler (TREBLE)	20 kHz, +10 dB ~ −10 dB
Gehörrichtige Lautstärkekorrektur (Loudness)	
(bei −30 dB Ausgangsleistung) (eingebaut)	50 Hz, +5 dB
Ausgangsspannung und -impedanz	
Tape, Aufnahme (TAPE, REC OUT)	150 mV
Kanalabweichung (Tape/Aux 250 Hz ~ 6300 Hz)	±1 dB
Übersprechdämpfung (Tape/Aux 1 kHz)	55 dB
Kopfhörerpegel und -impedanz	420 mV/330 Ω
Lautsprecherimpedanz	
MAIN oder REMOTE	4 Ω ~ 16 Ω
MAIN und REMOTE	8 Ω ~ 16 Ω

■ UKW-TUNERTEIL

Wellenbereich	87,50 ~ 108,00 MHz
Eingangsempfindlichkeit	
S/R 30 dB	1,3 μV (75 Ω)
S/R 26 dB	1,2 μV (75 Ω)
S/R 20 dB	0,9 μV (75 Ω)
Nutzempfindlichkeit nach IHF	1,5 μV (nach IHF '58)
Gesamtklirrfaktor	
Mono	0,15%
Stereo	0,3%
Geräuschabstand	
Mono	60 dB (77 dB nach IHF)
Stereo	58 dB (71 dB nach IHF)
Frequenzgang	20 Hz ~ 15 kHz (+1 dB ~ −2 dB)
Trennschärfe bei Störsender	±400 kHz, 75 dB
Einfangverhältnis	1 dB
Spiegelfrequenz-Dämpfung bei 98 MHz	75 dB
ZF-Dämpfung bei 98 MHz	100 dB
Ansprechdämpfung auf Nebenfrequenzen bei 98 MHz	100 dB
MW-Unterdrückung	50 dB
Übersprechdämpfung	
1 kHz	40 dB
10 kHz	30 dB
Trägerrest	
19 kHz	−55 dB (−60 dB nach IHF)
38 kHz	−65 dB (−70 dB nach IHF)
Kanalabweichung (250 Hz ~ 6300 Hz)	±1,5 dB
Begrenzereinsatz	1,2 μV
Bandbreite	
ZF-Verstärker	180 kHz
UKW-Demodulator	1000 kHz
Antennenanschluß	75 Ω (unsymmetrisch)

Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

■ MW-TUNERTEIL

Wellenbereiche	522 ~ 1611 kHz
Eingangsempfindlichkeit (S/R 20 dB)	20 μV, 300 μV/m
Trennschärfe	55 dB
Spiegelfrequenz-Dämpfung bei 1000 kHz	40 dB
ZF-Dämpfung bei 1000 kHz	60 dB

■ ALLGEMEINE DATEN

Leistungsaufnahme	220 W
Netzspannung	Wechselstrom 50 Hz/60 Hz, 220V
Abmessungen (B×H×T)	430 × 97 × 243 mm
Gewicht	5,0 kg

Bemerkung:
Der Gesamtklirrfaktor wurde mit einem digitalen Rauschspektrometer (Anlage H.P. 3045) gemessen.

■ MESSUNGEN UND JUSTIERUNGEN

Anmerkung: Die AM OSC-Spule (L202) und AM ZFT (T201) sind bereits justiert und benötigen keine Justierung.

AM (MW)-EINSTELLUNG

• Stellungen und zu benutzende Geräte
1. Elektronische Voltmeter für Wechsel- und Gleichstrom (VTVM)
2. AM (MW)-Meßsender (AM-SG)
3. Bereichsschalter . . . . . AM
4. Netzspannung auf ihren Sollwerthalten.
5. Der Ausgang des Meßsenders darf nicht höher sein als unbedingt notwendig für eine gute ablesung.
6. Einen nichtmetallischen Schraubenzieher für die Einstellungen verwenden.

Nr.	AM (MW)-MESSENDER ANSCHLUSS	AM (MW)-MESSENDER FREQUENZ	ANZEIGE-FREQUENZ DURCH VOR-EINSTELLUNG	VORBEREITUNG	ABGLEICH-SPUNKTE	ABGLEICHSVERFAHREN
	MW-HF-ABGLEICH					
1	Einen MW-Signal-generator über einen 200pF Kondensator mit dem MW-Antenne-neingang verbinden. Die gemeinsame Leitung mit dem Chassis verbinden. (Schwacher Eingang)	612kHz (400Hz Modulat., 30%)	612kHz	Oszilloskop oder Wechselstrom-Volt-meter uber den Lautsprecher schließen	L201 (Ant. Spule)	1. Auf max. Ausgang abgleichen 2. Den Ferritkern von L201 mit einem Schraubendreher justieren.
2		1503kHz (400Hz Modulat., 30%)	1503kHz		CT201 (Ant. Trimmer)	1. Auf max. Ausgang abgleichen. 2. Die Schritte (1) und (2) wied-erholen, bis die Frequenz genau mit der Skalenanzeige übereinstimmt.

FM (UKW)-EINSTELLUNG

• Stellungen und zu benutzenden Geräte
1. UKW-Meßsender (FM-SG)
2. Verzerrungsmesser
3. Elektronische Voltmeter für Wechsel-und Gleichstrom (VTVM)
4. Signalfrequenzmesser (meßar für 19kHz und 108MHz)
5. Bereichsschalter . . . . . FM
6. Den UKW-Betriebsartenschalter auf die "mono"-position stellen.
7. Die anderen Einstellungen sind gleich wie beider MW-Justierung.

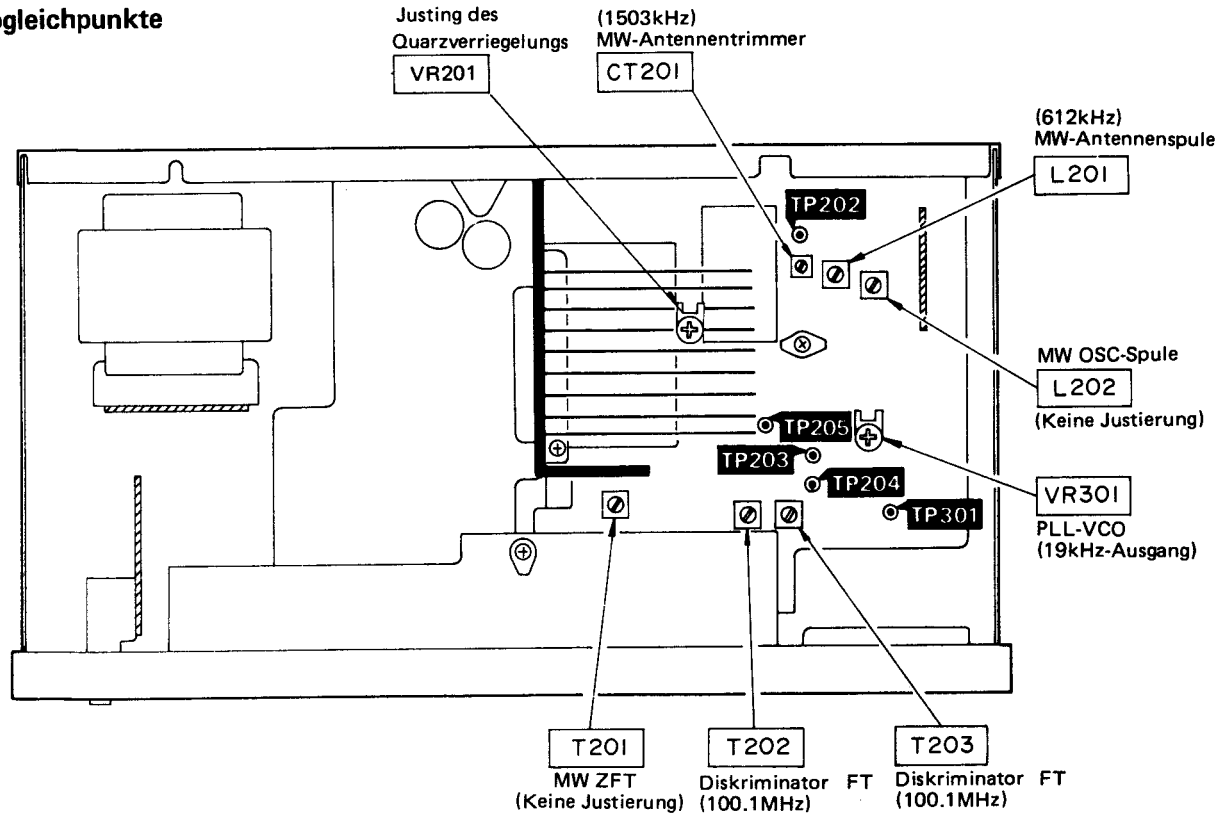
*** Vorbereitung des UKW-Meßoszillators (UKW-MO)**
1. Die Normal-Eingangs eistung dieses Gerätes beträgt 60dB (1mV), 400Hz, 100% Modulation. (Wegen der Dämpfung bei Verwendung von Koaxialkabeln, muß die MO-Ausgangsleistung 6dB oder mehr (IHF) betragen; d. h. wenn die Eingangsleistung 60dB beträgt, muß der MO-Ausgang 66dB betragen.)

Nr.	FM (UKW) MESSENDER ANSCHLUSS	FM (UKW) MESSENDER FREQUENZ	ANZEIGE-FREQUENZ DURCH VOR-EINSTELLUNG	VORBEREITUNG	ABGLEICH-SPUNKTE	ABGLEICHSVERFAHREN
	ABGLEICH AUF MIN. VERZERRUNG IN STELLUNG UKW-MONO					
3	UKW-MO an den UKW-Antennenanschluß entsprechend Abb. 17. (60dB an den Antennenanschluß legen.)	100.1MHz (400Hz Modulat., 100%)	100.1MHz	Ein Gleichstromrören-voltmeter zwishen TP203 und TP204 über eine Drosselspule verbinden. (Siehe Abb. 17)	T202 (Diskriminator FT)	1. Den Kern von T202 so justieren, daß die gemessene Spannung im signallosen Modus 0mV im 300mV Bereich beträgt.
4		100.1MHz (400Hz Modulat., 100%)	100.1MHz	Klirrfaktor-Meßbrücke uber den Lautsprecher schließen	T203 (Diskriminator FT)	1. T203 Kern für minimale Verzerrung der rechten und linken Kanäle justieren.
	JUSTIERUNG DES QUARZVERRIEGELUNGS-ANZEIGE-EIN-PEGELS					
5	UKW-MO an den UKW-Antennenanschluß anschließen. (16dB an den Antennenanschluß anlegen.)	100,1MHz (100% Modulation mit 400Hz)	100,1MHz	———	VR201	1. Gleichstrom-Voltmeter zwischen TP203 und TP204 anschließen, dann T202 so justieren, daß die gemessene Spannung im signallosen Modus 0mV im 300mV Bereich betragt. 2. Die Eingangsleistung um 1 ~ 2dB senken und VR201 so justieren, daß die Quarzanzeige ausschaltet.

UKW-STEREO-DEKODER-ABGLEICH	
UNTER VERWENDUNG EINES ZAHLES	ALTERNATIV-MEB METHODE
1. Unmodulierts Mono-Signal 100.1MHz in das Gerät speisen. 2. FM muting/mode-Schalter auf "on/FM auto" stellen. 3. Zähler über einen Widerstand 100k ohm an TP301 schließen. 4. **VR301** auf 19kHz ±30Hz einstellen.	1. Stereosignal entweder von einem Stereogenerator. Oder einem Sender einspeisen. 2. **VR301** so einstellen, bis die Stereolampe auf leuchtet. Schleifer von **VR301** sichern, wie in Abb. 19 gezeigt.

6

- **Abgleichpunkte**



CHANGES

■ REPLACEMENT PARTS LIST

Note: 1. Mentioned in this parts list are only those changed in Model No. SA-210 (order No. SD830224070) for destination [EX].

Ref. No.	Change of Part No. SA-210 [EX]	→ SA-210 (EGA)	Part Name & Description	Per Set (Pcs.)	
INTEGRATED CIRCUIT					
IC1	SVINJ4559DDM	AN6558F	Equalizer Amp	1	
COILS					
L81~84	Addition	ELQS181KB	Choke	4	
L250, 752	Addition	SLQZ12G1–D	Choke	2	
L290, 291	Addition	SLQZ12G1–D	Choke	2	
L301	Addition	SLM1C69–P	Choke	1	
L302	Addition	SLMA1Z3–Z	Choke	1	
L750, 751	Addition	SLQX400–D	Choke	2	
COMPONENT COMBINATIONS					
Z301, 302	EXRP181K473C	EXRP102K473C	100pF, 47kΩ	2	

Ref. No.	Change of Part No. SA-210 [EX] → SA-210 (EGA)		Part Name & Description	Per Set (Pcs.)	
FM FRONT END PACK					
	SNVFE306E05	SNVFE407G4S	Front End	1	
CERAMIC FILTER					
CF202	SVFE107MS8A	SVFT107MS2–A	FM, 10.7MHz (Red)	1	
	SVFE107MS8B	SVFT107MS2–B	FM, 10.67MHz (Blue)	1	
	SVFE107MS8C	SVFT107MS2–C	FM, 10.73MHz (Orange)	1	
CF203	SVFE107MS8A	SVFE107MZ2–A	FM, 10.7MHZ (Red)	1	
	SVFE107MS8B	SVFE107MZ2–B	FM, 10.67MHz (Blue)	1	
	SVFE107MS8C	SVFE107MZ2–C	FM, 10.73MHz (Organge)	1	
VARIABLE RESISTORS					
VR201	Addition	EVN58AA00B53	Quartz Lock Ind. ON Level Adj. 5kΩ (B)	1	
RESISTORS					
R3, 4	ER010MKG2213	ERD10TLJ224U	Carbon, 1/8W, 220kΩ, ±5%	2	
R51, 52	Addition	ERD25FJ152	Carbon, 1/4W, 1.5kΩ, ±5%	2	Ⓢ
R53, 54	Addition	ERD25FJ472	Carbon, 1/4W, 4.7kΩ, ±5%	2	Ⓢ
R83, 84	Addition	ERD25FJ272	Carbon, 1/4W, 2.7kΩ, ±5%	2	Ⓢ
R85, 86	Addition	ERD25TJ104	Carbon, 1/4W, 100kΩ, ±5%	2	Ⓢ
R211	ERD25FJ472	Deletion	– – – – – – – – – –	0	
R271	Addition	ERD25TJ393	Carbon, 1/4W, 39kΩ, ±5%	1	Ⓢ
R305	ERD25TJ334	ERD25TJ104	Carbon, 1/4W, 100kΩ, ±5%	1	Ⓢ
R307, 308	ERD25FJ332	ERD25FJ392	Carbon, 1/4W, 3.9kΩ, ±5%	2	Ⓢ
R309, 310	ERD25TJ104	ERD25TJ333	Carbon, 1/4W, 33kΩ, ±5%	2	Ⓢ
R351, 352	Addition	ERD25FJ103	Carbon, 1/4W, 10kΩ, ±5%	2	Ⓢ
R407, 408	ERD25TJ473	Deletion	– – – – – – – – – –	0	
R609, 610	ERDS1FJ122	ERDS1FJ102	Carbon, 1W, 1kΩ, ±5%	2	
R908	ERD25FJ220	ERD25FJ121	Carbon, 1/4W, 120Ω, ±5%	1	Ⓢ
CAPACITORS					
C81, 82	Addition	ECCD1H560KC	Ceramic, 50V, 56pF, ±10%	2	Ⓢ
C250	Addition	ECKD1H103ZF	Ceramic, 50V, 0.01μF, +80%, –20%	1	Ⓢ
C290	Addition	ECKD1H102ZF	Ceramic, 50V, 0.001μF, +80%, –20%	1	Ⓢ
C299	ECKD1H102ZF	Deletion	– – – – – – – – – – –	0	
C311, 312	ECQM1H153JZ	ECQM1H392JV3	Polyester, 50V, 0.0039μF, ± 5%	2	
C350	Addition	ECCD1H101K	Ceramic, 50V, 100pF, ±10%	1	Ⓢ
C351	Addition	ECEA1AS470	Electrolytic, 10V, 47μF	1	Ⓢ
C403, 404	ECQM1H333JZ	Deletion	– – – – – – – – – –	0	
C652	Addition	ECKD1H223ZF	Ceramic, 50V, 0.022μF, +80%, –20%	1	Ⓢ
C653	Addition	ECCD1H221K	Ceramic, 50V, 220pF, ±10%	1	Ⓢ
C655	Addition	ECKD1H223ZF	Ceramic, 50V, 0.022μF, +80%, –20%	1	Ⓢ
C950	Addition	ECQM1H333KZ	Polyester, 50V, 0.033μF, ±10%	1	Ⓢ

NO	FM	AM	NO	FM	AM	NO	FM	AM	NO	FM	AM
1	4.8	6.4	7	4.8	6.4	13	1.8	1.6			
2	0.6	5.8	8	4.8	6.4	14	5.2	7.0			
3	0.6	5.8	9	4.8	6.5	15	1.2				
4	0.6	5.8	10	4.7	6.1	16	1.5				
5	0	1.0	11	0		17	1.5				
6	0.2	0.9	12	5.3	7.0	18	0.5	5.8			

SUP27330

L302 LOW PASS FILTER

R352 10K
R351 10K
C351 10V47
C309 25V4.7
R309 3K
C311 0.0033
C310 25V4.7
R310 3K
C312 0.0039

AF signal (R ch.)

19kHz output

TP301

MPX VCO adj.

G SUP26014C

D207 LN846RP QUARTZ-LOCK IND
D208,209 LN446YP SIGNAL IND
D210 LN446YP SIGNAL IND
Q208 2SD636 SIGNAL INDICATOR DRIVE

R261 560
R262 150
R263 27
R264 220
R265 120
R266 1K
R267 270
R268 1K
R269 6.8K
C234 50V2.2
C245 0.01

J102

116

R273 100
C235 25V100

A **D** SUP25370

L81 L83 R83 2.7K
L82 L84 R84 2.7K
C81 56P
C82 56P
R85 100K
R86 100K

B (REC OUT Lch)
C (PLAYBACK Lch)
E (REC OUT Rch)
F (PLAYBACK Rch)

5.2ms
4.8V
0.3V
0.7ms

Equalizer amplifier circuit SUP24313-2

C

IC1 AN6558F EQUALIZER AMP

C1 50V3.3M
C2
C3 100P
C4
C5 470P
C6
C7 0.022
C8 C10
C9 0.0068
C11 50V2
C12
C13 6V33
C14
R1 390
R2
R3 22K
R4
R5 562K
R6
R7 270
R8
R9 68
R10 R12 R14
R11 180K
R13 12K
R15 56K
R16
R17 1K
R18

IC601 SVIK4141-2M 2CH POWER AMP

1	-0.1	7	-33.4	13	0	
2	-0.1	8	-33.4	14	-33.4	
3	0	9	-33.4	15	-1.3	
4	-7.9	10	0	16	0	
5	-1.3	11	32.8	17	-0.1	
6	0	12	31.4	18	-0.1	

D601 SVDMZ308B

NFB

C608 R606 R608 C610 C612
R604 C604 C606
C609 35V33
R622 1W 1.5K
R623 1/2 47
R614 2.2K
R616
C616
R618 L602
R620 C624
C618
R621 1/2 100
C615 25V10
R617 2W 0.22
L601 68
R619 1/2 10
C621 0.1
C623 0.1
R603 39K
C603 50V2.2
R605 220
C605 50V100
C619 50V100
C697 0.01
R697 2 47
C609 3P
R605 12K
R607 47K
C607 16V10
C611 22P
R611 15K
C613 22P
C614
R612
R610
R609 1/2 1K

R501 2.2K
C501 0.0022
C502 0.0022
R505 120K
C507 0.01
C503 0.022
R503 360
R509 2.2K
C504
R506
C506
R508
C505
R510
VR503-1 100KC (TREBLE)
VR503-2 (TREBLE)
VR504-1 (BASS)
VR504-2 (BASS)

Treble Bass

IC801 AN7072N MUTING & PROTECTION

-0.8 -1.3 -31.7 -31.9 -30.6 0 -4.5

C802 50V33
C803 50V33
C804 16V47
R807 150K
R809 39K
C801 16V10
D803
D798
R699 2.7K
D804 SVDMZ306B 6V ZENER
R698 10K
R806
R802
R804
D802
Q802
R805 27K
R801 330
R803 15K
D801
Q801
Q801,802 2SA992 OVER LOAD DET
D801,802,803,798 MA150

D799 SVDSRIK2
R810 1/2 33

S18 (PHONO)
S17 (TUNER)
S16 (TAPE MONITOR/AUX)
off → on
source → tape

D

J101 (VOLUME)
R401 2.2K
C401 330P
R402
C402
R403 330
R404
R405 680K
R406
R409 82K
C403 0.033
R410
C404
VR501-1 100KA
VR501-2
SUP 26014D

Volume

VR502 100KG (BALANCE)
C601 0.022
R601 1K
R602
C602

Balance

IC701 AN7812 REGULATOR

D702 SVDMZ303B 3V ZENER
D706 SVDMZ306B 6V ZENER
D711~714 SVDS2V20 RECTIFIER

R715 100
R703 1/2 1K
R704 2W 390
R702 1/2 39
D703
L752 100
IC701
D702
R712 1/2 6.8
C703 42V4700
C702 42V4700
D715
C704
R705 680
Q701
D708
R716 220
R707 1/2 1.5K
C712 0.01
C705 16V47
D704
D711
C713 0.1
D712
D714
C709 0.01
R708 1/2 2K
R709 1K
C700 16V47
D705
D707
C711 25V100
R710 1/2 39
D705 SVDSRIK2 RECTIFIER
D704 SVDMZ314C 14V ZENER
D703 MA116OM 6V ZENER
D707 SVDMZ322A 22V ZENER

Q701 2SC1685 REGULATOR

Power source circuit

C706 25V47
R731 100

E SUP26014E

J105
HEADPHONES
R625 1/2 330
R626
C655 0.022
C653 220P
L ch
SPEAKERS
R ch
C652 0.022

SUP 26014H

J106
T701
AC 260
AC 260
AC 260
AC 6.0
AC 33

SUP 26014G

SUP26014F (POWER)
F1 △250V T1A
SI9
C701 0.01
L750 00
L751 00
AC50/60Hz 220V
SUP25690

F

B

C922 16V10
C901 0.01
Q901
Q902
D5 4.9 Vdd
C907 50V1000
IC903 AN6873N FL DRIVER
Z901 100K x 7
C915 K330P
R918 100K
R919 100K
R908 120
Q909
C908 50V100
C909 25V4.7
-5V
-24V

LW d G5 Dp Dp G4 e c g2 G3 a2 b2 G2 FM g MHz J Gi c2 f2 a2 d2 F

■ SCHEMATIC DIAGRAM .

(This schematic diagram may be modified at any time with the development of new technology.)

*The part No. of transistors, IC and diodes mentioned in the schematic diagram stand for production part No. Regarding the part No. with ✪ mark, the production part No. are different from the replacement part No. Therefore, when placing an order for replacement part, please use the part No. in the replacement part list.

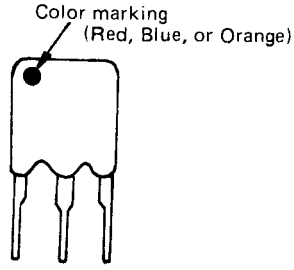
Notes:

1. **S1:** Band selector switch in "**FM**" position.
   FM ↔ AM
2. **S5, 6:** Tuning switch
   [S5 – down (tuning to lower frequency)
   S6 – up (tuning to higher frequency)]
3. **S7:** Memory switch. (manual ↔ auto)
4. **S8 ~ 14:** Preset tuning switch.
   [S8 – CH. 1 S11 – CH. 4 S14 – CH. 6
   S9 – CH. 2 S12 – CH. 5
   S10 – CH. 3 S13 – CH. 6]
5. **S15:** Automatic-scan/FM mode selector switch in "**on/auto**" position.
   on/auto ↔ off (manual)/mono
6. **S16:** Tape monitor/aux selector switch in "**source**" position.
   source ↔ tape/aux
7. **S17, 18:** Input selector switch in "**tuner**" position.
   [S17 – tuner
   S18 – phono]
8. **S19:** Power source switch in "**on**" position.
9. Important safety notice:
   Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
10. Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.
    * Figures in [ ] stand for DC voltage in FM signal mode.
    * Figures in < > stand for DC voltage in FM stereo signal reception mode.
    * Figures in ( ) stand for DC voltage in AM signal reception mode.
11. ▬▬ Positive voltage lines ····· AF signal lines
    ⇨ FM signal ▫▫▫▷ FM IF
    ▬▶ AM signal ▪▪▪▶ AM IF
    ▪▪▪▪▪ Negative voltage lines

NOTE

- **Use of ceramic filters in pairs**

The ceramic filters (CF202, CF203) for FM-IF circuit are available in three ranks. For this machine, be sure to use the ceramics of the same rank in a pair.
At repairing and replacement, pay close attention to the diodes (D907, D908) for use as different diodes must be used depending on each rank of the ceramic filters.



RANK (color)	D907	D908	CENTER FREQUENCY
Red	X	X	10.70 MHz
Orange	X	O	10.73 MHz
Blue	O	O	10.67 MHz

Notes: O Mark Diode is Used.
X Mark Diode is not used.

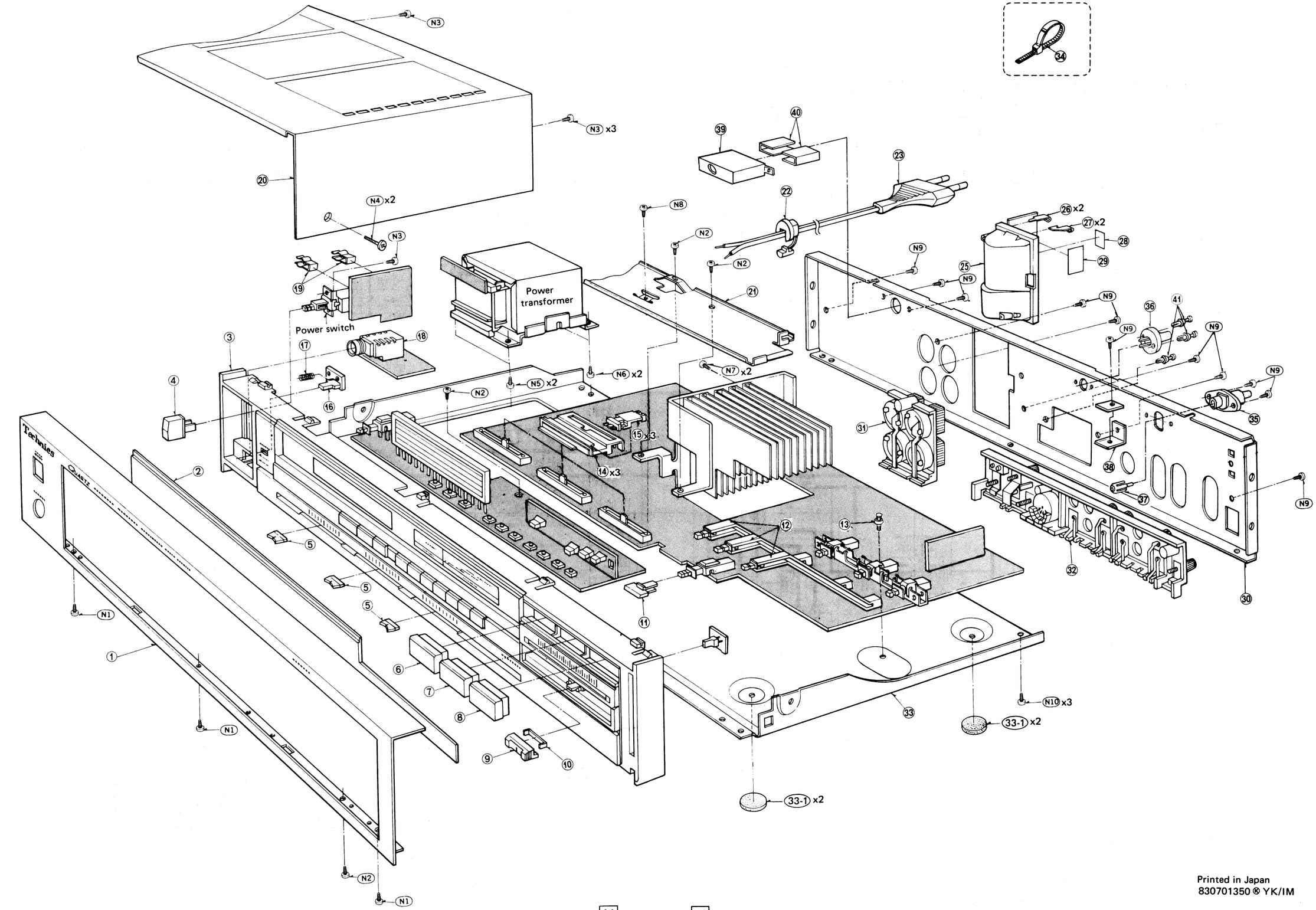
CHANGES

■ REPLACEMENT PARTS LIST

Note: 1. Mentioned in this parts list are only those changed in Model No. SA-210 (order No. SD83022407C8) for destination [EX].

Ref. No.	Change of Part No.		Part Name & Description	Per Set (Pcs.)	
	SA-210 [EX] →	SA-210 [EGA]			
CABINET and CHASSIS PARTS					
30	SGP3490–2A	SGP3490–3A	Rear Panel	1	
32	SJF8037–10N	SJF8037–12N	Terminal Board	1	
35	Addition	SJS9105	Socket, FM	1	
36	Addition	SJFA3101–1	Terminal Board, AM	1	
37	Addition	RJP5	Connector	1	
38	Addition	SUW1429	Bracket	1	
39	Addition	SMC1015	Shield Cover	1	
40	Addition	SMX681	Shield Cover	2	
41	Addition	SHR401–1	Pin	3	
SCREWS					
N11	XSN26+6BV	Deletion	⊕ 2.6 x 6	0	
N12	XWA26BFZ	Deletion	Washer, ϕ 2.6	0	
ACCESSORIES					
A5	SSA267–1	SSA901	Cord, Antenna (FM)	1	
A7	SJP5215	Deletion	Plug	0	
A8	SQF11713	SQF11777	Instruction Book	1	

■ EXPLODED VIEW



Printed in Japan
830701350 ® YK/IM

ORDER NO. SD83072613C2

Service Manual

QUARTZ Synthesizer FM/AM Stereo Receiver

SA-210

[EGA]

SA-210(K)

[EGA]

Area

* [EGA] is available in F.R. Germany.

* The colors of this model included silver and black.
* The black type model is provided with (K) in the Service Manual.

Please use this manual together with the service manual for Model No. SA-210, Order No. SD83022407C8.

■ TECHNISCHE DATEN (Spezifikationen Können infolge von Verbesserungen ohne Ankündigung geändert werden.)

(DIN 45 500)

■ VERSTÄRKERTEIL

Dauerton-Ausgangsleistung bei 20 Hz ~ 20 kHz	
beide Kanäle ausgesteuert	2 × 25W (4 Ω) 2 × 25W (8 Ω)
Dauerton-Ausgangsleistung bei 40 Hz ~ 16 kHz	
beide Kanäle ausgesteuert	2 × 25W (4 Ω)
DIN-Ausgangsleistung	2 × 25W (4 Ω)
Dauerton-Ausgangsleistung bei 1 kHz	
beide Kanäle ausgesteuert	2 × 30W (4 Ω) 2 × 27W (8 Ω)
Gesamtklirrfaktor	
Nennleistung bei 20 Hz ~ 20 kHz	0,8% (4 Ω) 0.5% (8 Ω)
Nennleistung bei 40 Hz ~ 16 kHz	0,8% (4 Ω) 0,5% (8 Ω)
Nennleistung bei 1 kHz	0,8% (4 Ω) 0,5% (8 Ω)
halbe Nennleistung bei 1 kHz	0,05% (8 Ω)
−26 dB Leistung bei 1 kHz	0,1% (4 Ω)
50 mW Leistung bei 1 kHz	0,12% (4 Ω)
Intermodulationsfaktor	
Nennleistung bei 250 Hz: 8 kHz = 4:1, 4 Ω	0,8%
Nennleistung bei 60 Hz: 7 kHz = 4:1, nach SMPTE, 8 Ω	0,5%
Leistungsbandbreite	
beide Kanäle ausgesteuert bei −3 dB	10 Hz ~ 30 kHz (4 Ω)
Dämpfungsfaktor	15 (4 Ω), 30 (8 Ω)
Eingangsempfindlichkeit und -impedanz	
Phono	2,5 mV/47 kΩ
Tape/Aux	150 mV/18 kΩ
Maximale TA-Eingangsspannung (1 kHz, eff.)	150 mV
Geräuschabstand	
Nennleistung (4 Ω)	
Phono	70 dB (nach IHF, A: 73 dB)
Tape/Aux	88 dB (nach IHF, A: 95 dB)
−26 dB Leistung (4 Ω)	
Phono	64 dB
Tape/Aux	66 dB
50 mW Leistung (4 Ω)	
Phono	62 dB
Tape/Aux	62 dB
Frequenzgang	
Phono	RIAA-Standardkurve ±0,8 dB (30 Hz ~ 15 kHz)
Tape/Aux (Max. Lautstärke)	5 Hz ~ 70 kHz (−3 dB)
Klangregler	
Baßregler (BASS)	50 Hz, +10 dB ~ −10 dB
Höhenregler (TREBLE)	20 kHz, +10 dB ~ −10 dB
Gehörrichtige Lautstärkekorrektur (Loudness)	
(bei −30 dB Ausgangsleistung) (eingebaut)	50 Hz, +5 dB
Ausgangsspannung und -impedanz	
Tape, Aufnahme (TAPE, REC OUT)	150 mV
Kanalabweichung (Tape/Aux 250 Hz ~ 6300 Hz)	±1 dB
Übersprechdämpfung (Tape/Aux 1 kHz)	55 dB
Kopfhörerpegel und -impedanz	420 mV/330 Ω
Lautsprecherimpedanz	
MAIN oder REMOTE	4 Ω ~ 16 Ω
MAIN und REMOTE	8 Ω ~ 16 Ω

■ UKW-TUNERTEIL

Wellenbereich	87,50 ~ 108,00 MHz
Eingangsempfindlichkeit	
S/R 30 dB	1,3 μV (75 Ω)
S/R 26 dB	1,2 μV (75 Ω)
S/R 20 dB	0,9 μV (75 Ω)
Nutzempfindlichkeit nach IHF	1,5 μV (nach IHF '58)
Gesamtklirrfaktor	
Mono	0,15%
Stereo	0,3%
Geräuschabstand	
Mono	60 dB (77 dB nach IHF)
Stereo	58 dB (71 dB nach IHF)
Frequenzgang	20 Hz ~ 15 kHz (+1 dB ~ −2 dB)
Trennschärfe bei Störsender	±400 kHz, 75 dB
Einfangverhältnis	1 dB
Spiegelfrequenz-Dämpfung bei 98 MHz	75 dB
ZF-Dämpfung bei 98 MHz	100 dB
Ansprechdämpfung auf Nebenfrequenzen bei 98 MHz	100 dB
MW-Unterdrückung	50 dB
Übersprechdämpfung	
1 kHz	40 dB
10 kHz	30 dB
Trägerrest	
19 kHz	−55 dB (−60 dB nach IHF)
38 kHz	−65 dB (−70 dB nach IHF)
Kanalabweichung (250 Hz ~ 6300 Hz)	±1,5 dB
Begrenzereinsatz	1,2 μV
Bandbreite	
ZF-Verstärker	180 kHz
UKW-Demodulator	400 kHz
Antennenanschluß	75 Ω (unsymmetrisch)

Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

■ MW-TUNERTEIL

Wellenbereiche	522 ~ 1611 kHz
Eingangsempfindlichkeit (S/R 20 dB)	20 μV, 300 μV/m
Trennschärfe	55 dB
Spiegelfrequenz-Dämpfung bei 1000 kHz	40 dB
ZF-Dämpfung bei 1000 kHz	60 dB

■ ALLGEMEINE DATEN

Leistungsaufnahme	220 W
Netzspannung	Wechselstrom 50 Hz/60 Hz, 220V
Abmessungen (B×H×T)	430 × 97 × 243 mm
Gewicht	5,0 kg

Bemerkung:
Der Gesamtklirrfaktor wurde mit einem digitalen Rauschspektrometer (Anlage H.P. 3045) gemessen.

■ MESSUNGEN UND JUSTIERUNGEN

Anmerkung: Die AM OSC-Spule (L202) und AM ZFT (T201) sind bereits justiert und benötigen keine Justierung.

AM (MW)-EINSTELLUNG

• Stellungen und zu benutzende Geräte
1. Elektronische Voltmeter für Wechsel- und Gleichstrom (VTVM)
2. AM (MW)-Meßsender (AM-SG)
3. Bereichsschalter . . . . . AM
4. Netzspannung auf ihren Sollwerthalten.
5. Der Ausgang des Meßsenders darf nicht höher sein als unbedingt notwendig für eine gute ablesung.
6. Einen nichtmetallischen Schraubenzieher für die Einstellungen verwenden.

Nr.	AM (MW)-MESSENDER ANSCHLUSS	AM (MW)-MESSENDER FREQUENZ	ANZEIGE-FREQUENZ DURCH VOR-EINSTELLUNG	VORBEREITUNG	ABGLEICH-SPUNKTE	ABGLEICHSVERFAHREN
	MW-HF-ABGLEICH					
1	Einen MW-Signal-generator über einen 200pF Kondensator mit dem MW-Antenne-neingang verbinden. Die gemeinsame Leitung mit dem Chassis verbinden. (Schwacher Eingang)	612kHz (400Hz Modulat., 30%)	612kHz	Oszilloskop oder Wechselstrom-Volt-meter uber den Lautsprecher schließen	L201 (Ant. Spule)	1. Auf max. Ausgang abgleichen 2. Den Ferritkern von L201 mit einem Schraubendreher justieren.
2		1503kHz (400Hz Modulat., 30%)	1503kHz		CT201 (Ant. Trimmer)	1. Auf max. Ausgang abgleichen. 2. Die Schritte (1) und (2) wied-erholen, bis die Frequenz genau mit der Skalenanzeige übereinstimmt.

FM (UKW)-EINSTELLUNG

• Stellungen und zu benutzenden Geräte
1. UKW-Meßsender (FM-SG)
2. Verzerrungsmesser
3. Elektronische Voltmeter für Wechsel-und Gleichstrom (VTVM)
4. Signalfrequenzmesser (meßar für 19kHz und 108MHz)
5. Bereichsschalter . . . . . FM
6. Den UKW-Betriebsartenschalter auf die "mono"-position stellen.
7. Die anderen Einstellungen sind gleich wie beider MW-Justierung.

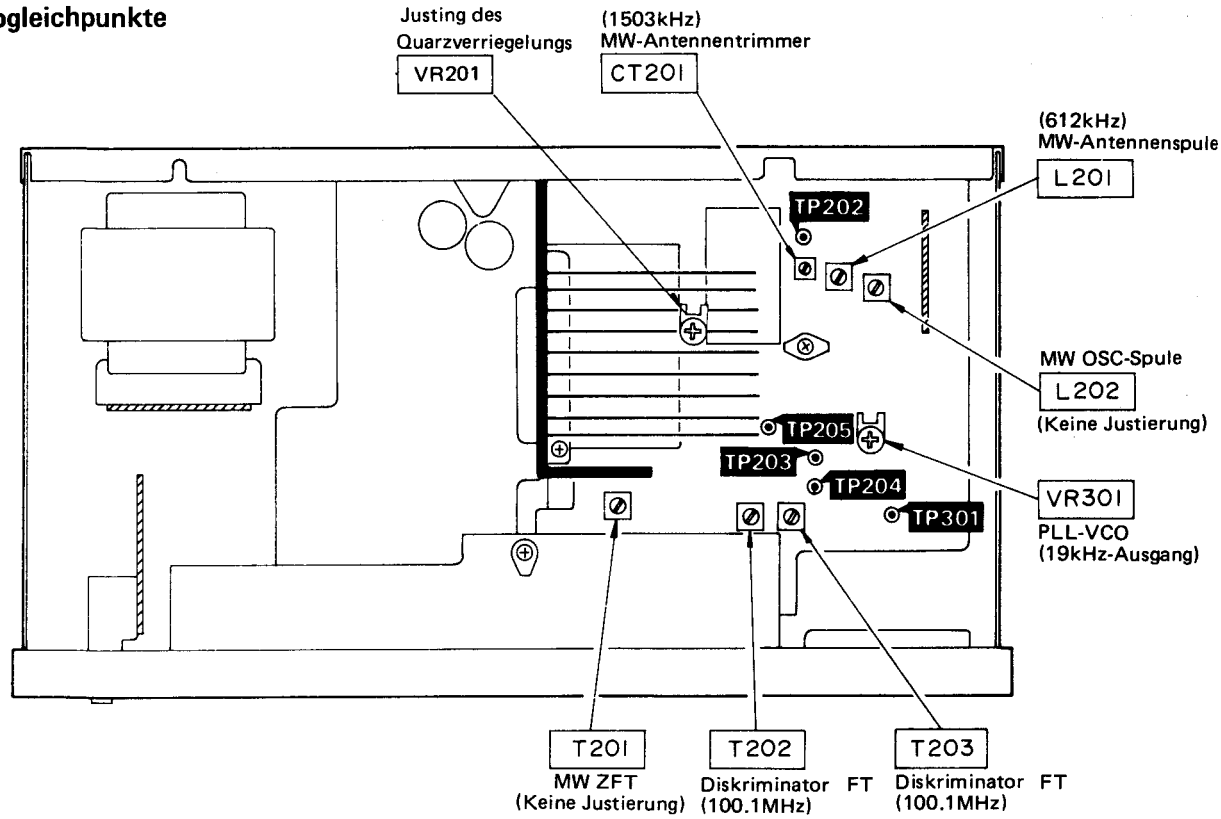
*** Vorbereitung des UKW-Meßoszillators (UKW-MO)**
1. Die Normal-Eingangs eistung dieses Gerätes beträgt 60dB (1mV), 400Hz, 100% Modulation. (Wegen der Dämpfung bei Verwendung von Koaxialkabeln, muß die MO-Ausgangsleistung 6dB oder mehr (IHF) betragen; d. h. wenn die Eingangsleistung 60dB beträgt, muß der MO-Ausgang 66dB betragen.)

Nr.	FM (UKW) MESSENDER ANSCHLUSS	FM (UKW) MESSENDER FREQUENZ	ANZEIGE-FREQUENZ DURCH VOR-EINSTELLUNG	VORBEREITUNG	ABGLEICH-SPUNKTE	ABGLEICHSVERFAHREN
	ABGLEICH AUF MIN. VERZERRUNG IN STELLUNG UKW-MONO					
3	UKW-MO an den UKW-Antennenanschluß entsprechend Abb. 17. (60dB an den Antennenanschluß legen.)	100.1MHz (400Hz Modulat., 100%)	100.1MHz	Ein Gleichstromrören-voltmeter zwishen TP203 und TP204 über eine Drosselspule verbinden. (Siehe Abb. 17)	T202 (Diskriminator FT)	1. Den Kern von T202 so justieren, daß die gemessene Spannung im signallosen Modus 0mV im 300mV Bereich beträgt.
4		100.1MHz (400Hz Modulat., 100%)	100.1MHz	Klirrfaktor-Meßbrücke uber den Lautsprecher schließen	T203 (Diskriminator FT)	1. T203 Kern für minimale Verzerrung der rechten und linken Kanäle justieren.
	JUSTIERUNG DES QUARZVERRIEGELUNGS-ANZEIGE-EIN-PEGELS					
5	UKW-MO an den UKW-Antennenanschluß anschließen. (16dB an den Antennenanschluß anlegen.)	100,1MHz (100% Modulation mit 400Hz)	100,1MHz	———	VR201	1. Gleichstrom-Voltmeter zwischen TP203 und TP204 anschließen, dann T202 so justieren, daß die gemessene Spannung im signallosen Modus 0mV im 300mV Bereich betragt. 2. Die Eingangsleistung um 1 ~2dB senken und VR201 so justieren, daß die Quarzanzeige ausschaltet.

UKW-STEREO-DEKODER-ABGLEICH	
UNTER VERWENDUNG EINES ZAHLES	ALTERNATIV-MEB METHODE
1. Unmodulierts Mono-Signal 100.1MHz in das Gerät speisen. 2. FM muting/mode-Schalter auf "on/FM auto" stellen. 3. Zähler über einen Widerstand 100k ohm an TP301 schließen. 4. **VR301** auf 19 kHz ±30Hz einstellen.	1. Stereosignal entweder von einem Stereogenerator. Oder einem Sender einspeisen. 2. **VR301** so einstellen, bis die Stereolampe auf leuchtet. Schleifer von **VR301** sichern, wie in Abb. 19 gezeigt.

6

- **Abgleichpunkte**



CHANGES

■ REPLACEMENT PARTS LIST

Note: 1. Mentioned in this parts list are only those changed in Model No. SA-210 (order No. SD830224070B) for destination [EX].

Ref. No.	Change of Part No. SA-210 [EX]	→ SA-210 (EGA)	Part Name & Description	Per Set (Pcs.)	
INTEGRATED CIRCUIT					
IC1	SVINJ4559DDM	AN6558F	Equalizer Amp	1	
COILS					
L81~84	Addition	ELQS181KB	Choke	4	
L250, 752	Addition	SLQZ12G1–D	Choke	2	
L290, 291	Addition	SLQZ12G1–D	Choke	2	
L301	Addition	SLM1C69–P	Choke	1	
L302	Addition	SLMA1Z3–Z	Choke	1	
L750, 751	Addition	SLQX400–D	Choke	2	
COMPONENT COMBINATIONS					
Z301, 302	EXRP181K473C	EXRP102K473C	100pF, 47kΩ	2	

Ref. No.	Change of Part No. SA-210 [EX] → SA-210 [EGA]		Part Name & Description	Per Set (Pcs.)	
FM FRONT END PACK					
	SNVFE306E05	SNVFE407G4S	Front End	1	
CERAMIC FILTER					
CF202	SVFE107MS8A	SVFT107MS2–A	FM, 10.7MHz (Red)	1	
	SVFE107MS8B	SVFT107MS2–B	FM, 10.67MHz (Blue)	1	
	SVFE107MS8C	SVFT107MS2–C	FM, 10.73MHz (Orange)	1	
CF203	SVFE107MS8A	SVFE107MZ2–A	FM, 10.7MHZ (Red)	1	
	SVFE107MS8B	SVFE107MZ2–B	FM, 10.67MHz (Blue)	1	
	SVFE107MS8C	SVFE107MZ2–C	FM, 10.73MHz (Organge)	1	
VARIABLE RESISTORS					
VR201	Addition	EVN58AA00B53	Quartz Lock Ind. ON Level Adj. 5kΩ (B)	1	
RESISTORS					
R3, 4	ER010MKG2213	ERD10TLJ224U	Carbon, 1/8W, 220kΩ, ±5%	2	
R51, 52	Addition	ERD25FJ152	Carbon, 1/4W, 1.5kΩ, ±5%	2	Ⓢ
R53, 54	Addition	ERD25FJ472	Carbon, 1/4W, 4.7kΩ, ±5%	2	Ⓢ
R83, 84	Addition	ERD25FJ272	Carbon, 1/4W, 2.7kΩ, ±5%	2	Ⓢ
R85, 86	Addition	ERD25TJ104	Carbon, 1/4W, 100kΩ, ±5%	2	Ⓢ
R211	ERD25FJ472	Deletion	– – – – – – – – – –	0	
R271	Addition	ERD25TJ393	Carbon, 1/4W, 39kΩ, ±5%	1	Ⓢ
R305	ERD25TJ334	ERD25TJ104	Carbon, 1/4W, 100kΩ, ±5%	1	Ⓢ
R307, 308	ERD25FJ332	ERD25FJ392	Carbon, 1/4W, 3.9kΩ, ±5%	2	Ⓢ
R309, 310	ERD25TJ104	ERD25TJ333	Carbon, 1/4W, 33kΩ, ±5%	2	Ⓢ
R351, 352	Addition	ERD25FJ103	Carbon, 1/4W, 10kΩ, ±5%	2	Ⓢ
R407, 408	ERD25TJ473	Deletion	– – – – – – – – – –	0	
R609, 610	ERDS1FJ122	ERDS1FJ102	Carbon, 1W, 1kΩ, ±5%	2	
R908	ERD25FJ220	ERD25FJ121	Carbon, 1/4W, 120Ω, ±5%	1	Ⓢ
CAPACITORS					
C81, 82	Addition	ECCD1H560KC	Ceramic, 50V, 56pF, ±10%	2	Ⓢ
C250	Addition	ECKD1H103ZF	Ceramic, 50V, 0.01μF, +80%, –20%	1	Ⓢ
C290	Addition	ECKD1H102ZF	Ceramic, 50V, 0.001μF, +80%, –20%	1	Ⓢ
C299	ECKD1H102ZF	Deletion	– – – – – – – – – –	0	
C311, 312	ECQM1H153JZ	ECQM1H392JV3	Polyester, 50V, 0.0039μF, ± 5%	2	
C350	Addition	ECCD1H101K	Ceramic, 50V, 100pF, ±10%	1	Ⓢ
C351	Addition	ECEA1AS470	Electrolytic, 10V, 47μF	1	Ⓢ
C403, 404	ECQM1H333JZ	Deletion	– – – – – – – – – –	0	
C652	Addition	ECKD1H223ZF	Ceramic, 50V, 0.022μF, +80%, –20%	1	Ⓢ
C653	Addition	ECCD1H221K	Ceramic, 50V, 220pF, ±10%	1	Ⓢ
C655	Addition	ECKD1H223ZF	Ceramic, 50V, 0.022μF, +80%, –20%	1	Ⓢ
C950	Addition	ECQM1H333KZ	Polyester, 50V, 0.033μF, ±10%	1	Ⓢ

NO	FM	AM	NO	FM	AM	NO	FM	AM
1	4.8	6.4	7	4.8	6.4	13	1.8	1.6
2	0.6	5.8	8	4.8	6.4	14	5.2	7.0
3	0.6	5.8	9	4.8	6.5	15	1.2	
4	0.6	5.8	10	4.7	6.1	16	1.5	
5	0	1.0	11	0		17	1.5	
6	0.2	0.9	12	5.3	7.0	18	0.5	5.8

SUP27330

AF signal (R ch.)

19kHz output

TP301

MPX VCO adj.

SUP26014C

D207 LN846RP QUARTZ-LOCK IND

D208,209 LN446YP SIGNAL IND

D210 LN446YP SIGNAL IND

Q208 2SD636 SIGNAL INDICATOR DRIVE

SUP25370

(REC OUT Lch)

(PLAYBACK Lch)

(REC OUT Rch)

(PLAYBACK Rch)

5.2ms

4.8V

0.3V

0.7ms

Equalizer amplifier circuit SUP24313-2

IC1 AN6558F EQUALIZER AMP

IC601 SVIK4141-2M 2CH POWER AMP

1	-0.1	7	-33.4	3	0
2	-0.1	8	-33.4	4	-33.4
3	0	9	-33.4	5	-1.3
4	-7.9	10	0	6	0
5	-1.3	11	32.8	7	-0.1
6	0	12	31.4	8	-0.1

D601 SVDMZ308B

NFB

IC601

D799 SVDSRIK2

IC801 AN7072N MUTING & PROTECTION

D804 SVDMZ306B 6V ZENER

Q801,802 2SA992 OVER LOAD DET

D801,802,803,798 MA150

Q802

Q801

SUP26014E

HEADPHONES

L ch

SPEAKERS

R ch

SUP26014B

IC903 AN6873N FL DRIVER

Q909

-5V

-24V

SUP26014D

S18 (PHONO)

S17 (TUNER)

S16 (TAPE MONITOR/AUX)

(VOLUME)

Volume

Balance

Treble

Bass

IC701 AN7812 REGULATOR

Q701 2SC1685 REGULATOR

Power source circuit

D702 SVDMZ303B 3V ZENER

D706 SVDMZ306B 6V ZENER

D711~714 SVDS2V20 RECTIFIER

D708 SVDMZ306C1 6V ZENER

D704 SVDMZ314C 14V ZENER

D703 MA1160M 6V ZENER

D707 SVDMZ322A 22V ZENER

D705 SVDSRIK2 RECTIFIER

SUP26014H

SUP26014G

SUP26014F (POWER)

T701

SUP25690

AC50/60Hz 220V

■ SCHEMATIC DIAGRAM

(This schematic diagram may be modified at any time with the development of new technology.)

*The part No. of transistors, IC and diodes mentioned in the schematic diagram stand for production part No. Regarding the part No. with ✪ mark, the production part No. are different from the replacement part No. Therefore, when placing an order for replacement part, please use the part No. in the replacement part list.

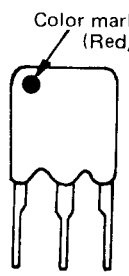
Notes:

1. **S1:** Band selector switch in "**FM**" position.
   FM ↔ AM
2. **S5, 6:** Tuning switch
   [S5 – down (tuning to lower frequency)
   S6 – up (tuning to higher frequency)]
3. **S7:** Memory switch. (manual ↔ auto)
4. **S8 ~ 14:** Preset tuning switch.
   [S8 – CH. 1 S11 – CH. 4 S14 – CH. 6
   S9 – CH. 2 S12 – CH. 5
   S10 – CH. 3 S13 – CH. 6]
5. **S15:** Automatic-scan/FM mode selector switch in "**on/auto**" position.
   on/auto ↔ off (manual)/mono
6. **S16:** Tape monitor/aux selector switch in "**source**" position.
   source ↔ tape/aux
7. **S17, 18:** Input selector switch in "**tuner**" position.
   [S17 – tuner
   S18 – phono]
8. **S19:** Power source switch in "**on**" position.
9. Important safety notice:
   Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
10. Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.
    * Figures in [ ] stand for DC voltage in FM signal mode.
    * Figures in < > stand for DC voltage in FM stereo signal reception mode.
    * Figures in ( ) stand for DC voltage in AM signal reception mode.
11. ▬▬ Positive voltage lines ····· AF signal lines
    ⇨ FM signal ▫▫▫▷ FM IF
    ➡ AM signal ▪▪▪▶ AM IF
    ▪▪▪▪▪ Negative voltage lines

NOTE

- **Use of ceramic filters in pairs**

The ceramic filters (CF202, CF203) for FM-IF circuit are available in three ranks. For this machine, be sure to use the ceramics of the same rank in a pair.
At repairing and replacement, pay close attention to the diodes (D907, D908) for use as different diodes must be used depending on each rank of the ceramic filters.



RANK (color)	D907	D908	CENTER FREQUENCY
Red	X	X	10.70 MHz
Orange	X	O	10.73 MHz
Blue	O	O	10.67 MHz

Notes: O Mark Diode is Used.
X Mark Diode is not used.

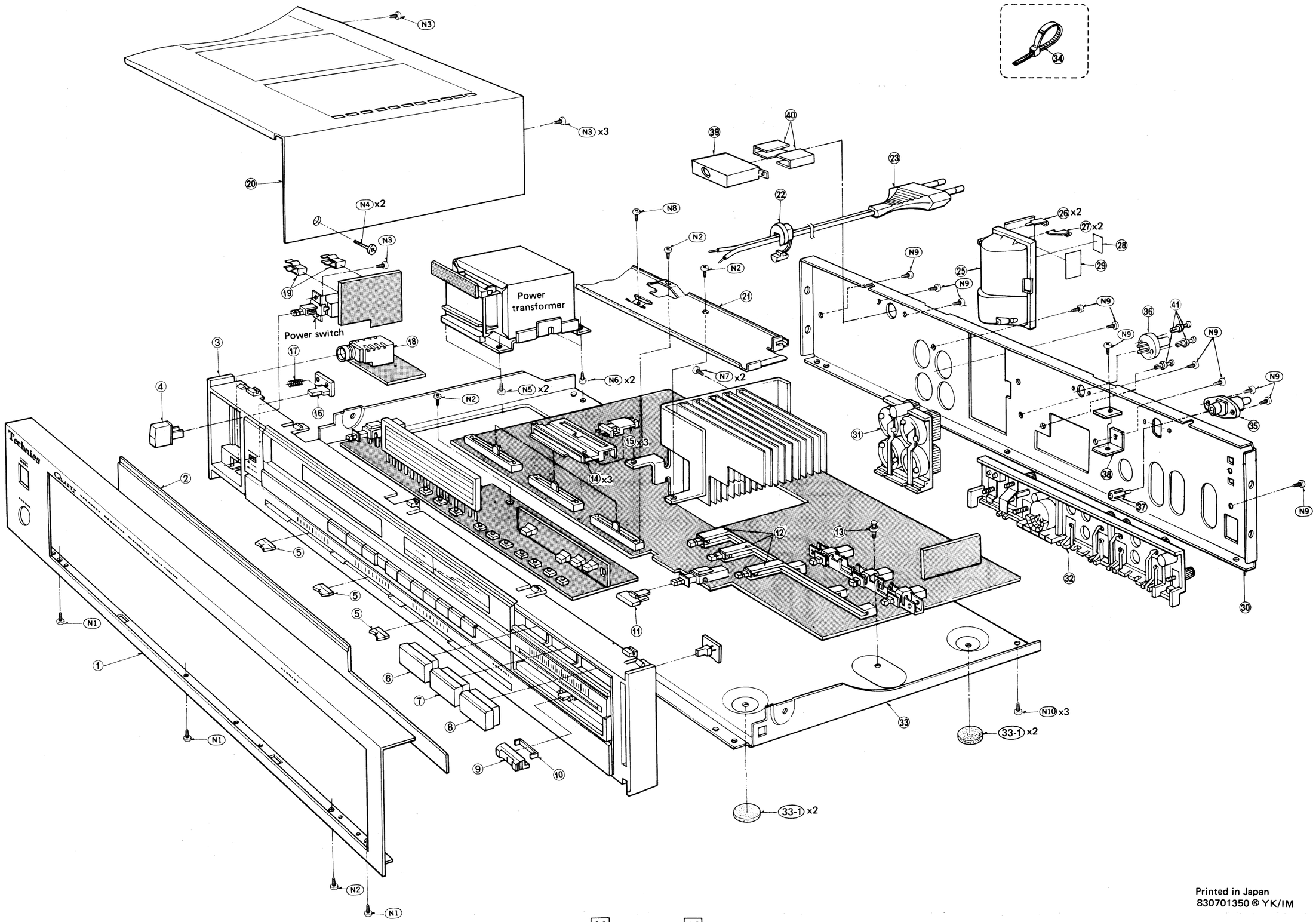
CHANGES

■ REPLACEMENT PARTS LIST

Note: 1. Mentioned in this parts list are only those changed in Model No. SA-210 (order No. SD83022407C8) for destination [EX].

Ref. No.	Change of Part No.		Part Name & Description	Per Set (Pcs.)	
	SA-210 [EX]	SA-210 [EGA]			
CABINET and CHASSIS PARTS					
30	SGP3490–2A	SGP3490–3A	Rear Panel	1	
32	SJF8037–10N	SJF8037–12N	Terminal Board	1	
35	Addition	SJS9105	Socket, FM	1	
36	Addition	SJFA3101–1	Terminal Board, AM	1	
37	Addition	RJP5	Connector	1	
38	Addition	SUW1429	Bracket	1	
39	Addition	SMC1015	Shield Cover	1	
40	Addition	SMX681	Shield Cover	2	
41	Addition	SHR401–1	Pin	3	
SCREWS					
N11	XSN26+6BV	Deletion	⊕ 2.6 x 6	0	
N12	XWA26BFZ	Deletion	Washer, ϕ2.6	0	
ACCESSORIES					
A5	SSA267–1	SSA901	Cord, Antenna (FM)	1	
A7	SJP5215	Deletion	Plug	0	
A8	SQF11713	SQF11777	Instruction Book	1	

■ EXPLODED VIEW

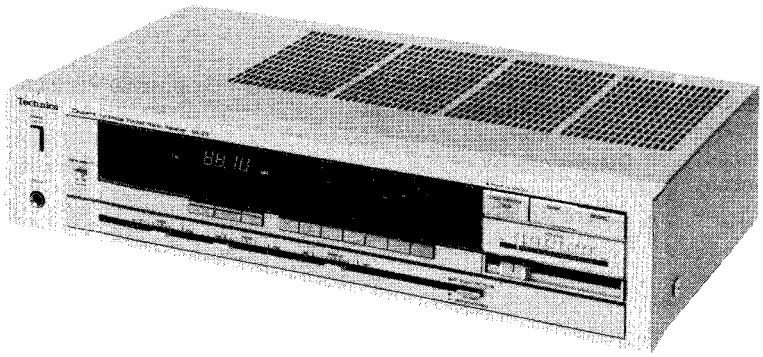


Printed in Japan
830701350 ® YK/IM

ORDER NO. SD83022407C8

Service Manual

QUARTZ Synthesizer FM/AM Stereo Receiver



SA-210

[EX],[EH],[XA],[XL]

SA-210(K)

[EX],[EH]

* The colors of this model included silver and black.
* The black type model is provided with (K) in the Service Manual.

Areas

* [EX] is available in Switzerland and Scandinavia.
* [EH] is available in Holland.
* [XA] is available in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
* [XL] is available in Australia.

Specifications

(Specifications are subject to change without notice for further improvement.)

(DIN 45 500)

■ AMPLIFIER SECTION

40 Hz~20 kHz continuous power output	
both channels driven	2 × 25W (4Ω)
	2 × 25W (8Ω)
40 Hz~16 kHz continuous power output	
both channels driven	2 × 25W (4Ω)
	2 × 25W (8Ω)
1 kHz continuous power output	
both channels driven	2 × 27W (4Ω)
	2 × 27W (8Ω)
Total harmonic distortion	
rated power at 40 Hz~20 kHz	0.8% (4Ω)
	0.5% (8Ω)
rated power at 40 Hz~16 kHz	0.8% (4Ω)
	0.5% (8Ω)
rated power at 1 kHz	0.5% (4Ω)
	0.5% (8Ω)
half power at 1 kHz	0.05% (8Ω)
−26 dB power at 1 kHz	0.1% (4Ω)
50 mW power at 1 kHz	0.12% (4Ω)
Intermodulation distortion	
rated power at 250 Hz: 8 kHz=4:1, 4Ω	0.8%
rated power at 60 Hz: 7 kHz=4:1, SMPTE, 8Ω	0.5%
Power bandwidth	
both channels driven, −3 dB	10 Hz~30 kHz (4Ω)
Damping factor	15 (4Ω), 30 (8Ω)
Input sensitivity and impedance	
PHONO	2.5 mV/47kΩ
TAPE/AUX	150 mV/18kΩ
PHONO maximum input voltage (1 kHz, RMS)	150 mV
Frequency response	
PHONO	RIAA standard curve
	±0.8 dB (30 Hz~15 kHz)
TAPE/AUX (Volume at max)	5 Hz~70 kHz (−3 dB)
Tone controls	
BASS	50 Hz, +10 dB~ −10 dB
TREBLE	20 kHz, +10 dB~ −10 dB
S/N	
rated power (4Ω)	
PHONO	70 dB (IHF, A: 73 dB)
TAPE/AUX	88 dB (IHF, A: 95 dB)
−26 dB power (4Ω)	
PHONO	64 dB
TAPE/AUX	66 dB
50 mW power (4Ω)	
PHONO	62 dB
TAPE/AUX	62 dB
Loudness control (volume at −30 dB) (built in)	50 Hz, +5 dB
Output voltage and impedance	
TAPE REC OUT	150 mV
Channel balance, TAPE/AUX 250 Hz~6,300 Hz	±1 dB
Channel separation, TAPE/AUX 1 kHz	55 dB
Headphones output level and impedance	420 mV/330Ω
Load impedance	4Ω~16Ω

■ FM TUNER SECTION

Frequency range	87.50~108.00 MHz
Sensitivity	
S/N 30 dB	1.9 μV (300Ω), 1.3 μV (75Ω)
S/N 26 dB	1.7 μV (300Ω), 1.2 μV (75Ω)
S/N 20 dB	1.5 μV (300Ω), 0.9 μV (75Ω)
IHF usable sensitivity	1.9 μV (IHF '58)
IHF 46 dB stereo quieting sensitivity	22 μV/75Ω
Total harmonic distortion	
MONO	0.15%
STEREO	0.3%
S/N	
MONO	60 dB (77 dB, IHF)
STEREO	58 dB (71 dB, IHF)
Frequency response	20 Hz~15 kHz, +1 dB~ −2 dB
Alternate channel selectivity	±400 kHz 70 dB
Capture ratio	1 dB
Image rejection at 98 MHz	55 dB
IF rejection at 98 MHz	75 dB
Spurious response rejection at 98 MHz	82 dB

Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

AM suppression	50 dB
Stereo separation	
1 kHz	40 dB
10 kHz	30 dB
Carrier leak	
19 kHz	−33 dB (−35 dB, IHF)
38 kHz	−50 dB (−50 dB, IHF)
Channel balance (250 Hz~6,300 Hz)	±1.5 dB
Limiting point	1.2 μV
Bandwidth	
IF amplifier	180 kHz
FM demodulator	1000 kHz
Antenna terminals	300Ω (balanced) 75Ω (unbalanced)

■ AM TUNER SECTION

Frequency range	522~1611 kHz (9 kHz-step) 530~1620 kHz (10 kHz-step)
Sensitivity (S/N 20 dB)	20 μV, 300 μV/m
Selectivity	55 dB
Image rejection at 1,000 kHz	40 dB
IF rejection at 1,000 kHz	60 dB

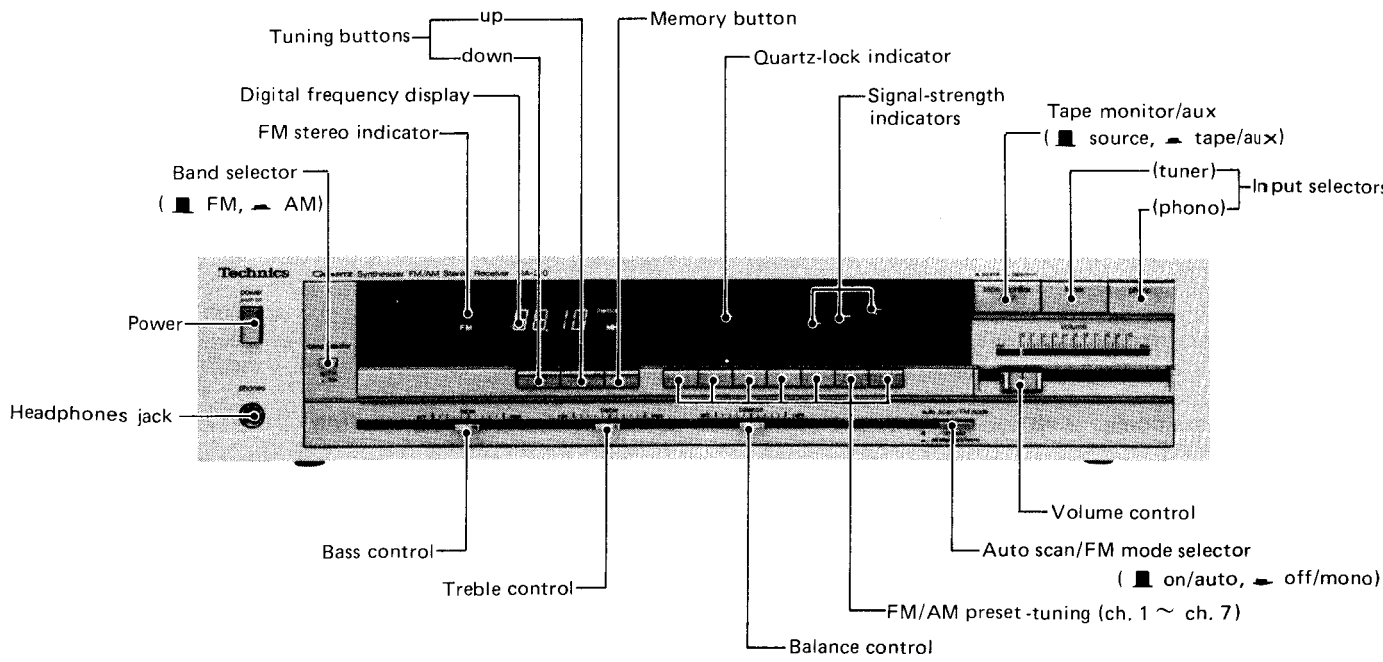
■ GENERAL

Power consumption	220W
Power supply	
For United Kingdom and Australia	AC 50 Hz/60 Hz, 240V
For continental Europe	AC 50 Hz/60 Hz, 220V
For others	AC 50 Hz/60 Hz, 110V/120V/220V/240V
Dimensions (W×H×D)	430 × 97 × 243 mm (16-15/16" × 3-13/16" × 9-9/16")
Weight	5.1 kg (11.2 lb.)

■ CONTENTS

	Page
LOCATION OF CONTROLS	2
PROTECTION CIRCUITRY	3
BEFORE REPAIR AND ADJUSTMENT	3
HOW TO PRESET RADIO BROADCAST FREQUENCIES	4
DISASSEMBLY INSTRUCTIONS	4 ~ 6
MEASUREMENTS AND ADJUSTMENTS	7,8
TERMINAL GUIDE OF TRANSISTORS, DIODES AND IC'S	9
PRINTED CIRCUIT BOARDS	10 ~ 11
BLOCK DIAGRAM	12 ~ 14
SCHEMATIC DIAGRAM	15 ~ 19
FUNCTION OF TERMINAL (PLL CONTROLLER IC901)	20
RESISTORS & CAPACITORS	20, 21
REPLACEMENT PARTS LIST	22
EXPLODED VIEWS	23, 24

■ LOCATION OF CONTROLS



UKW-STEREO-DEKODER-ABGLEICH	
UNTER VERWENDUNG EINES ZAHLES	ALTERNATIV-MEB METHODE
1. Unmodulierts Mono-Signal 100.1MHz in das Gerät speisen. 2. FM muting/mode-Schalter auf "on/FM auto" stellen. 3. Zähler über einen Widerstand 100k ohm an TP301 schließen. 4. **VR301** auf 19kHz ±30Hz einstellen.	1. Stereosignal entweder von einem Stereogenerator. Oder einem Sender einspeisen. 2. **VR301** so einstellen, bis die Stereolampe auf leuchtet. Schleifer von **VR301** sichern, wie in Abb. 19 gezeigt.

FRANÇAIS

■ CARACTERISTIQUES (Sujet à changement sans préavis.)

(DIN 45 500)

■ SECTION AMPLIFICATEUR

Puissance de sortie continue de 40 Hz~20 kHz, les deux canaux en circuit 2 × 25W (4Ω), 2 × 25W (8Ω)
Puissance de sortie continue de 40 Hz~16 kHz, les deux canaux en circuit 2 × 25W (4Ω), 2 × 25W (8Ω)
Puissance de sortie continue à 1 kHz les deux canaux en circuit 2 × 27W (4Ω), 2 × 27W (8Ω)
Distorsion harmonique totale
à puissance nominale (40 Hz~20 kHz) 0,8% (4Ω), 0,5% (8Ω)
à puissance nominale (40 Hz~16 kHz) 0,8% (4Ω), 0,5% (8Ω)
à puissance nominale (1 kHz) 0,5% (4Ω), 0,5% (8Ω)
à demi-puissance (1 kHz) 0,05% (8Ω)
puissance de −26 dB à 1 kHz 0,1% (4Ω)
puissance de 50 mW à 1 kHz 0,12% (4Ω)
Distorsion d'intermodulation
à puissance nominale a 250 Hz: 8 kHz=4:1, 4Ω 0,8%
à puissance nominale à 60 Hz: 7 kHz=4:1, SMPTE, 8Ω 0,5%
Réponse de fréquences
les deux canaux en circuit, −3 dB 10 Hz~30 kHz (4Ω)
Coefficient d'amortissement 15 (4Ω), 30 (8Ω)
Sensibilité et impédance d'entrée
PHONO 2,5 mV/47kΩ
BANDE/AUX (TAPE/AUX) 150 mV/18kΩ
PHONO (tension d'entrée maximum, 1 kHz RMS) 150 mV
Signal/Bruit
à puissance nominale (4Ω)
PHONO 70 dB (IHF, A: 73 dB)
BANDE/AUX (TAPE/AUX) 88 dB (IHF, A: 95 dB)
puissance de −26 dB (4Ω)
PHONO 64 dB
BANDE/AUX (TAPE/AUX) 66 dB
puissance de 50 mW (4Ω)
PHONO 62 dB
BANDE/AUX (TAPE/AUX) 62 dB
Réponse de fréquence
PHONO Courbe nominale RIAA ±0,8 dB (30 Hz~15 kHz)
BANDE/AUX (TAPE/AUX) (volume au maximum) 5 Hz~70 kHz (−3 dB)
Réglage de la tonalité
BASSES (BASS) 50 Hz, +10 dB~ −10 dB
AIGUS (TREBLE) 20 kHz, +10 dB~ −10 dB
Compensateur physiologique (volume à −30 dB) (incorporé) 50 Hz, +5 dB
Tension de sortie et impédance
SORTIE ENREGISTREMENT/BANDE (TAPE REC OUT) 150 mV
Equilibrage des canaux, TAPE/AUX 250 Hz~6 300 Hz ±1 dB
Séparation des canaux, TAPE/AUX 1 kHz 55 dB
Niveau de sortie des casques et impédance 420 mV/330Ω
Impédance de charge 4Ω~16Ω

■ SECTION SYNTONISATEUR FM

Gamme de fréquence 87,50~108,00 MHz
Sensibilité
S/B 30 dB 1,9 μV (300Ω), 1,3 μV (75Ω)
S/B 26 dB 1,7 μV (300Ω), 1,2 μV (75Ω)
S/B 20 dB 1,5 μV (300Ω), 0,9 μV (75Ω)
Sensibilité utilisable IHF 1,9 μV (IHF '58)
Sensibilité stéréo au seuil de 46 dB, IHF 22 μV/75Ω
Distorsion harmonique totale
MONO 0,15%
STEREO 0,3%
Signal/Bruit
MONO 60 dB (77 dB, IHF)
STEREO 58 dB (71 dB, IHF)
Réponse de fréquence 20 Hz~15 kHz, +1 dB~ −2 dB
Sélectivité alternée par canal ±400 kHz 70 dB
Taux de capture 1 dB
Rejection d'image à 98 MHz 55 dB
Rejection FI à 98 MHz 75 dB
Rejection de réponse parasite à 98 MHz 82 dB
Suppression AM 50 dB
Séparation stéréophonique
1 kHz 40 dB
10 kHz 30 dB
Fuite de porteuse
19 kHz −33 dB (−35 dB, IHF)
38 kHz −50 dB (−50 dB, IHF)
Equilibrage de canaux (250 Hz~6,300 Hz) ±1,5 dB
Point de limite 1,2 μV
Largeur de bande
Amplificateur FI 180 kHz
Démodulateur FM 1000 kHz
Bornes d'antenne 300Ω (symétrique), 75Ω (asymétrique)

■ SECTION SYNTONISATEUR AM

Gamme de fréquence 522~1611 kHz (9 kHz-step), 530~1620 kHz (10 kHz-step)
Sensibilité (S/B 20 dB) 20 μV, 300 μV/m
Sélectivité 55 dB
Réjection d'image à 1,000 kHz 40 dB
Réjection FI à 1,000 kHz 60 dB

■ DIVERS

Consommation 220W
Alimentation
Pour l'Europe CA 50 Hz/60 Hz, 220V
Autres CA 50 Hz/60 Hz, 110V/120V/220V/240V
Dimensions (L×H×Pr) 430 × 97 × 243 mm
Poids 5,1 kg

■ MESURAGES ET RÉGLAGES

Nota: La bobine de l'oscillateur de la modulation d'am plitude (L202) et le transformateur de fréquence intermédiaire de modulation d'amplitude (T201) ont déjà été ajustés et ne nécessitent plus de réglage.

REGLAGE DE AM

• Réglage et équipement utilisé
1. Voltmètres électronique de courant altèrnatif et de courant continu (VTVM)
2. Générateur du signal AM (AM-SG)
3. Sélecteur de gamme . . . . . AM
4. Régler le sélecteur d'attribution AM sur la position "9kHz step"
5. Conservel la tension du secteur à la tension nominale.
6. Le signal du générateur ne doit pas être plus élevé qu'il n'est nécessaire à obtenir une lecture en sortie.
7. Utiliser un tournevis non-métallique pour la rélage.

N°	AM GENERATEUR BRANCHEMENT	AM GENERATEUR FREQUENCE	FREQUENCE D'AFFICHAGE PAR PREREGLAGE	PREPARATIONS	ELEMENTS REGLES	PROCEDURE DE REGLAGE
	REGLAGE DE RF-AM					
1	Raccorder le générateur de signaux AM (modulation d'amplitude) à la borne d'antenne AM par l'intermédiaire d'un condensateur de 200 pF, en ser référant à la Fig. 7. (Entrée faible)	612kHz (modulé à 30% par 400Hz)	612kHz	Branchez un c.a. voltmétre électronique ou nu oscilloscope sur les bornes de haut-parleur.	L201 (Bobine Ant.)	1. Régler au maximum de signal de sortie. 2. Régler le noyau ferrite de L201 à l'aide d'un tournevis.
2		1503kHz (modulé à 30% par 400Hz)	1503kHz		CT201 (Trimmer Ant.)	1. Régler au maximum de signal de sortie. 2. Refaire les étapes (1) et (2) jusqu'à ce que le fréquence s'aligne correctement avec l'affichage du cadran.

REGLAGE DE FM

• Réglage et équipen, ent untilisé
1. Générateur du signal FM (FM-SG)
2. Jauge de distorsion.
3. Oscilloscope.
4. Voltmètres électronique de courant alternatif et de courant continu (VTVM).
5. Compteur de fréquence (19kHz et 108MHz mesurable).
6. Sélecteur d'entrée sur la position "FM".
7. Placer le sélecteur de mode FM sur la position "mono".
8. Les autres réglages sont les mêmes que pour la mise au point de l'amplitude modulée (AM).

*** Préparatif du générateur de signaux à Modulation de Fréquence (FM-SG)**
1. L'entrée normale de l'appareil est de 60dB (1mV). 400Hz, modulation de 100% , (Du fait de l'atténuation, utiliser des câbles coaxiaus. La sortie du générateur de signaux devra être de plus de 60dB (IHF). C'est-à-dire que lorsque l'entrée est de 60dB, la sortie du générateur de signaux devra être de 66dB).

N°	FM GENERATEUR BRANCHEMENT	FM GENERATEUR FREQUENCE	FREQUENCE D'AFFICHAGE PAR PREREGLAGE	PREPARATIONS	ELEMENTS REGLES	PROCEDURE DE REGLAGE
	REGLAGE DE LA DISTORSION FM EN MONO					
3	Raccorder de générateur de signaux FM à la borne d'antenne FM en se référant à la Fig. 17. (Appliquer 60dB à la borne d'antenne.)	100.1MHz (modulé à 100% par 400Hz)	100.1MHz	Brancher le voltmètre èlectronique a c.c. aux bornes TP203 et TP204 (Voir la Fig. 17)	T202 (Transfor FI discri.)	1. Régler e noyau T202 de telle sorte que le voltage mesuré dans le mode sans signal, soti de 0mV dans la gamme des 300mV.
4		100.1MHz (modulé à (100% par 400Hz)	100.1MHz	Branchez un distor-tion métre sur les bornes de haut-parleur de appareil	T203 (Transfor FI discri.)	1. Régler le noyou T203 de telle sorte que la distor-tion des canaux droit et gauche soit la plus faible.

REGLAGE PILOTE MULTIPLEX FM

N°	AVEC UN ERÉQUENCEMÉNTRE	PAR UN OUTRE SYSTÈME
5	1. Signal mono 100.1MHz non modulé appliqué à l'appareil. 2. Commutateur de silencieux sur "on/FM auto". 3. Branchez le fréquencermètre sur TP301 à travers une. 4. Régler **VR301** sur 19kHz ± 30Hz.	1. Appliquez à l'appareil un signal stéréo provenant d'un générateur ou de la réception d'un émetteur. 2. Régler **VR301** jusque à ce que l'indicateur de stéréo-phonic s'allume. Collez le curseur le **VR301** comme indiqué sur la fig. 19.

ESPAÑOL

■ ESPECIFICACIONES (Estas especificaciones están sujetas a cualquier cambio sin previo eviso.)

(DIN 45 500)

■ SECCION AMPLIFICADOR

Potencia continua de 40 Hz~20 kHz en ambos canales	2 × 25W (4Ω) 2 × 25W (8Ω)
Potencia continua de 40 Hz~16 kHz en ambos canales	2 × 25W (4Ω) 2 × 25W (8Ω)
Potencia continua de 1 kHz en ambos canales	2 × 27W (4Ω) 2 × 27W (8Ω)
Distorsión armónica total	
potencia de régimen a 40 Hz~20 kHz	0,8% (4Ω) 0,5% (8Ω)
potencia de régimen a 40 Hz~16 kHz	0,8% (4Ω) 0,5% (8Ω)
potencia de régimen a 1 kHz	0,5% (4Ω) 0,5% (8Ω)
mitad de potencia a 1 kHz	0,05% (8Ω)
−26 dB de potencia a 1 kHz	0,1% (4Ω)
50 mW de potencia a 1 kHz	0,12% (4Ω)
Distorsión por intermodulación	
potencia de régimen a 250 Hz: 8 kHz=4:1, 4Ω	0,8%
potencia de régimen a 60 Hz: 7 kHz=4:1, SMPTE, 8Ω	0,5%
Ancho de banda de potencia con ambos canales, −3 dB	10 Hz~30 kHz (4Ω)
Factor de amortiguamiento	15 (4Ω), 30 (8Ω)
Sensibilidad e impedancia de entrada	
TOCADISC. (PHONO)	2,5 mV/47kΩ
GRAB./AUX. (TAPE/AUX)	150 mV/18kΩ
Voltaje máximo de entrada de PHONO (1 kHz, RMS)	150 mV
Relación de señal a ruido	
potencia de régimen (4Ω)	
TOCADISC. (PHONO)	70 dB (IHF, A: 73 dB)
GRAB./AUX. (TAPE/AUX)	88 dB (IHF, A: 95 dB)
−26 dB de potencia (4Ω)	
TOCADISC. (PHONO)	64 dB
GRAB./AUX. (TAPE/AUX)	66 dB
50 mW de potencia (4Ω)	
TOCADISC. (PHONO)	62 dB
GRAB./AUX. (TAPE/AUX)	62 dB
Respuesta de frecuencia	
TOCADISC. (PHONO)	curva RIAA estándar ±0,8 dB (30 Hz~15 kHz)
GRAB./AUX. (TAPE/AUX) (volumen al máximo)	5 Hz~70 kHz (−3 dB)
Controles de tono	
BAJOS (BASS)	50 Hz, +10 dB~ −10 dB
AGUDOS (TREBLE)	20 kHz, +10 dB~ −10 dB
Control de sonoridad (volumen a −30 dB) (incorporado)	50 Hz, +5 dB
Voltaje e impedancia de salida	
GRAB. SAL. GRAB.(TAPE REC OUT)	150 mV
Equilibrio de canales, TAPE/AUX 250 Hz~6 300 Hz	±1 dB
Separación de canales, TAPE/AUX 1 kHz	55 dB
Impedancia y nivel de salida de los auriculares	420 mV/330Ω
Impedancia de carga	4Ω~16Ω

■ SECCION PARA SINTONIZADOR FM

Gama de frecuencias	87,50~108,00 MHz
Sensibilidad	
Señal a ruido 30 dB	1,9 μV (300Ω), 1,3 μV (75Ω)
Señal a ruido 26 dB	1,7 μV (300Ω), 1,2 μV (75Ω)
Señal a ruido 20 dB	1,5 μV (300Ω), 0,9 μV (75Ω)
Sensibilidad utilizable IHF	1,9 μV (IHF '58)
Sensibilidad de acallamiento estéreo de 46 dB IHF	22 μV/75Ω
Distorsión armónica total	
MONO. (MONO)	0,15%
ESTEREO (STEREO)	0,3%
Relación de señal a ruido	
MONO. (MONO)	60 dB (77 dB, IHF)
ESTEREO (STEREO)	58 dB (71 dB, IHF)
Respuesta de frecuencia	20 Hz~15 kHz, +1 dB~ −2 dB
Selectividad alternada de canal	±400 kHz 70 dB
Relación de captura	1 dB
Rechazo de imagen a 98 MHz	55 dB
Rechazo de F.I. a 98 MHz	75 dB
Rechazo de respuesta espuria a 98 MHz	82 dB
Supresión AM	50 dB
Separación estereofónica	
1 kHz	40 dB
10 kHz	30 dB
Fuga de onda portadora	
19 kHz	−33 dB (−35 dB, IHF)
38 kHz	−50 dB (−50 dB, IHF)
Equilibrio de canales 250 Hz~6 300 Hz	±1,5 dB
Punto de límite	1,2 μV
Ancho de banda	
Amplificador FI	180 kHz
Demodulador FM	1000 kHz
Bornes de antena	300Ω (equilibrado) 75Ω (no equilibrado)

■ SECCION PARA SINTONIZADOR AM

Gama de frecuencias	522~1611 kHz (9 kHz-step) 530~1620 kHz (10 kHz-step)
Sensibilidad (Relación de señal a ruido de 20 dB)	20 μV, 300 μV/m
Selectividad	55 dB
Rechazo de imagen a 1.000 kHz	40 dB
Rechazo de F.I. a 1.000 kHz	60 dB

■ GENERAL

Consumo de energía	220W
Alimentación de energía	
Para Europa continental	CA 50 Hz/60 Hz, 220V
Para otros paises	CA 50 Hz/60 Hz, 110V/120V/220V/240V
Dimensiones (An.×Al.×Prof.)	430 × 97 × 243 mm
Peso	5,1 kg

■ MEDICIONES Y AJUSTES

Note: Bobina AM OSC (L202) y AM IFT (T201) han sido ya ajustados.

AJUSTE DE AM

• Puesta y Uso de equido
1. Voltimetros electronicos de CA y CC (VTVA).
2. Generador de señales AM (AM-SG)
3. Poner selector FM-AM en position "AM".
4. Poner selector de asignación AM en posición "9kHz step".
5. Mantener voltaje de línea a voltaje nominal.
6. La salida de generador de señales no debe ser mayor que la necesaria para obtener una lectura de salida.
7. Para el ajuste use un destornillador no metálico.

Nº.	AM GENERADOR DE SEÑALES: CONEXION	AM GENERADOR DE SEÑALES: FRECUENCIA	A FRECUENCIA DE PRESENTACION	PREPARACIONES	PIEZAS AJUSTADAS	PROCEDIMIENTO DE AJUSTE
	AJUSTE RF-AM					
1	Conector AM-SG a terminal de antena AM a través de capacitor 200pF. Cumún a chasis. (Entrada débil)	612kHz (Mod. 30% (con 400Hz)	612kHz	Conectar VTVM de CA u osciloscopio a terminales de "SPEAKER" (altavoz).	L201 (Bobina ANT AM)	1. Ajustar para salida máxima. 2. Ajustar núcleo de ferrita de L201 con destornillador.
2		1503kHz (Mod. 30% (con 400Hz)	1503kHz	Conectar VTVM de CA u osciloscopio a terminales de "SPEAKER" (altavoz).	CT201 (Trimer de ANT AM)	1. Ajustor para solida máxima. 2. Repetir pasos (1) y (2) hasta que la frecuencia se adapte correctamente a la escala del cuadrante.

AJUSTE DE FM

• Equipo usado
1. Generador de señales FM (FM-SG)
2. Analizador de distortion.
3. Osciloscopio.
4. Voltimetros electrónicos de CA y CC (VTVM).
5. Frecuencimetro (19kHz y 108MHz medibles).
6. Poner selector FM-AM en posicion "FM"
7. Poner el interruptor de modalidad FM en la posición "MONO".
8. Otras puestas son las mismas que en ajuste AM.

*** Preparación de generador de señales FM (FM-SG)**
1. La entrada standard del aparato es 60dB (1mV), 400Hz, modulación 100% (Debido a atenuación usando cables coaxiales La salida SG ha de ser 6dB más. Es decir, cuando la entrada 60dB, la salida de SG ha de ser 66dB.)

Nº.	FM GENERADOR DE SEÑALES: CONEXION	FM GENERADOR DE SEÑALES: FRECUENCIA	A FRECUENCIA DE PRESENTACION	PREPARACIONES	PIEZAS AJUSTADAS	PROCEDIMIENTO DE AJUSTE
	AJUSTE DE DISTORSION FM MONO					
3	Conectar SG-FM a terminal de antenna FM refiriendo a Fig. 17. (Aplicar 60dB a terminal de antena)	100.10MHz (Mod. 100% con 400Hz)	100.10MHz	Conector VTVM CC entre terminal TP203 y TP204 a través de bobina de choque. (Referira Fig. 17).	T202 (Discri. IFT)	1. Ajustar núcleo de T202 de manera que voltaje medído en modalidad de señal se 0mV en gema de 300mV.
4		100.10MHz (Mod. 100% con 400Hz)	100.10MHz	Conectar osciloscopio a terminal "speaker" (altavoz)	T203 (Discri. IFT)	1. Ajustar núcleo de T203 de manera que distorsión de canales derecho e izquierdo se minimice.

Nº.	AJUSTE DE V.C.O. MPX de FM: USANDO UN FREQUENCIMETRO	AJUSTE DE V.C.O. MPX de FM: USANDO SISTEMA ALTERNATIVO
5	1. Señal mono no modulada de 100.10MHz 60dB aplicada al aparato. 2. Interruptor de modalidad/sinlenciador FM a "auto FM". 3. Conectar frecuéncimetro a TP301 a través de resistor (100kΩ). (Vea la Fig. 18.) 4. Ajustar **VR301** a 19kHz ± 30Hz.	1. Aplicar una señal estereofónica al aparato o recibir una emisión estereofónica. 2. Ajustar **VR301** y fijar el contacto deslizante de **VR301** en el medio de la gama-ON del indicador estereofónico. (Vea la Fig. 19.)

Printed in Japan
830204400 ® YK/IM
830700500

ORDER NO. SD83022407C8–A

QUARTZ Synthesizer FM/AM Stereo Receiver SA-210/SA-210(K)

DEUTSCH

- This booklet contains the specifications and adjusting procedures for SA-210, written Germany, French and Spanish.
- File this manual together with the SA-210 service manual (Order No. SD83022407C8).

- Diese Broschüre enthält die technischen Daten und die Beschreibungen der Justiermethoden für SA-210 in deutscher, französischer und spanisher Sprache.
- Bewahren Sie das Büchlein zusammen mit der Bedienungsanleitung für SA-210 (Betstell-Nr. SD83022407C8) auf.

- Cette brochure contient les spécifications et les procédures de réglage pour le SA-210, écrites en allemand, en français et en espagnol.
- Classer ce manuel en même temps qu'avec le manuel de service du SA-210 (N° d'ordre: SD83022407C8).

- Este librito contiene las especificaciones y procedimientos de ajuste para SA-210, escritas en alemán, francés y español.
- Guardar este manual juntamente con el manual de servicio de SA-210 (Pedido N°. SD83022407C8).

DEUTSCH

■ TECHNISCHE DATEN (Spezifikationen Können infolge von Verbesserungen ohne Ankündigung geändert werden.)

(DIN 45 500)

■ VERSTÄRKERTEIL

Dauerton-Ausgangsleistung bei 40 Hz ~ 20 kHz	
beide Kanäle ausgesteuert	2 × 25W (4 Ω)
	2 × 25W (8 Ω)
Dauerton-Ausgangsleistung bei 40 Hz ~ 16 kHz	
beide Kanäle ausgesteuert	2 × 25W (4 Ω)
	2 × 25W (8 Ω)
Dauerton-Ausgangsleistung bei 1 kHz	
beide Kanäle ausgesteuert	2 × 27W (4 Ω)
	2 × 27W (8 Ω)
Gesamtklirrfaktor	
Nennleistung bei 40 Hz ~ 20 kHz	0,8% (4 Ω)
	0,5% (8 Ω)
Nennleistung bei 40 Hz ~ 16 kHz	0,8% (4 Ω)
	0,5% (8 Ω)
Nennleistung bei 1 kHz	0,5% (4 Ω)
	0,5% (8 Ω)
halbe Nennleistung bei 1 kHz	0,05% (8 Ω)
−26 dB Leistung bei 1 kHz	0,1% (4 Ω)
50 mW Leistung bei 1 kHz	0,12% (4 Ω)
Intermodulationsfaktor	
Nennleistung bei 250 Hz: 8 kHz = 4:1, 4 Ω	0,8%
Nennleistung bei 60 Hz: 7 kHz = 4:1, nach SMPTE, 8 Ω	0,5%
Leistungsbandbreite	
beide Kanäle ausgesteuert bei −3 dB	10 Hz ~ 30 kHz (4 Ω)
Dämpfungsfaktor	15 (4 Ω), 30 (8 Ω)
Eingangsempfindlichkeit und -impedanz	
Phono	2,5 mV/47 kΩ
Tape/Aux	150 mV/18 kΩ
Maximale TA-Eingangsspannung (1 kHz, eff.)	150 mV
Frequenzgang	
Phono	RIAA-Standardkurve ±0,8 dB (30 Hz ~ 15 kHz)
Tape/Aux (max. Lautstärke)	5 Hz ~ 70 kHz(−3 dB)
Klangregler	
Baßregler (BASS)	50 Hz, +10 dB ~ −10 dB
Höhenregler (TREBLE)	20 kHz, +10 dB ~ −10 dB
Geräuschabstand	
Nennleistung (4 Ω)	
Phono	70 dB (nach IHF, A: 73 dB)
Tape/Aux	88 dB (nach IHF, A: 95 dB)
−26 dB Leistung (4 Ω)	
Phono	64 dB
Tape/Aux	66 dB
50 mW Leistung (4 Ω)	
Phono	62 dB
Tape/Aux	62 dB
Gehörrichtige Lautstärkekorrektur (Loudness)	
(bei −30 dB Ausgangsleistung) (eingebaut)	50 Hz, +5 dB
Ausgangsspannung und -impedanz	
Tape Aufnahme (TAPE REC OUT)	150 mV
Kanalabweichung (Tape/Aux, 250 Hz ~ 6300 Hz)	±1 dB
Übersprechdämpfung (Tape/Aux, 1 kHz)	55 dB
Kopfhörerpegel und -impedanz	420 mV/330 Ω
Lautsprecherimpedanz	4 Ω ~ 16 Ω

■ UKW-TUNERTEIL

Wellenbereich	87,50 ~ 108,00 MHz
Eingangsempfindlichkeit	
S/R 30 dB	1,9 μV (300 Ω), 1,3 μV (75 Ω)
S/R 26 dB	1,7 μV (300 Ω), 1,2 μV (75 Ω)
S/R 20 dB	1,5 μV (300 Ω), 0,9 μV (75 Ω)
Nutzempfindlichkeit nach IHF	1,9 μV (nach IHF '58)
Stereoumschaltschwelle bei 46 dB nach IHF	22 μV/75 Ω
Gesamtklirrfaktor	
Mono	0,15%
Stereo	0,3%
Geräuschabstand	
Mono	60 dB (77 dB nach IHF)
Stereo	58 dB (71 dB nach IHF)
Frequenzgang	20 Hz ~ 15 kHz (+1 dB ~ −2 dB)
Trennschärfe bei Störsender	±400 kHz 70 dB
Einfangverhältnis	1 dB
Spiegelfrequenz-Dämpfung bei 98 MHz	55 dB
ZF-Dämpfung bei 98 MHz	75 dB
Ansprechdämpfung auf Nebenfrequenzen bei 98 MHz	82 dB
MW-Unterdrückung	50 dB

Übersprechdämpfung	
1 kHz	40 dB
10 kHz	30 dB
Trägerrest	
19 kHz	−33 dB (−35 dB nach IHF)
38 kHz	−50 dB (−50 dB nach IHF)
Kanalabweichung (250 Hz ~ 6300 Hz)	±1,5 dB
Begrenzereinsatz	1,2 μV
Bandbreite	
ZF-Verstärker	180 kHz
UKW-Demodulator	1000 kHz
Antennenanschluß	300 Ω (symmetrisch) 75 Ω (unsymmetrisch)

■ MW-TUNERTEIL

Wellenbereiche	522 ~ 1611 kHz (9 kHz-step) 530 ~ 1620 kHz (10 kHz-step)
Eingangsempfindlichkeit (S/R 20 dB)	20 μV, 300 μV/m
Trennschärfe	55 dB
Spiegelfrequenz-Dämpfung bei 1000 kHz	40 dB
ZF-Dämpfung bei 1000 kHz	60 dB

■ ALLGEMEINE DATEN

Leistungsaufnahme	220 W
Netzspannung	
Für Kontinentaleuropa	Wechselstrom 50 Hz/60 Hz, 220V
Für andere Länder	Wechselstrom 50 Hz/60 Hz, 110V/120V/220V/240V
Abmessungen (B×H×T)	430 × 97 × 243 mm
Gewicht	5,1 kg

■ MESSUNGEN UND JUSTIERUNGEN

Anmerkung: Die AM OSC-Spule (L202) und AM ZFT (T201) sind bereits justiert und benötigen keine Justierung.

AM (MW)-EINSTELLUNG

• Stellungen und zu benutzende Geräte

1. Elektronische Voltmeter für Wechsel- und Gleichstrom (VTVM)
2. AM (MW)-Meßsender (AM-SG)
3. Bereichsschalter . . . . . AM
4. AM (MW) Wellenverteilungs-Wahlschalter auf Position "9kHz" stellen.
5. Netzspannung auf ihren Sollwerthalten.
6. Der Ausgang des Meßsenders darf nicht höher sein als unbedingt notwendig für eine gute ablesung.
7. Einen nichtmetallischen Schraubenzieher für die Einstellungen verwenden.

Nr.	AM (MW)-MESSENDER ANSCHLUSS	AM (MW)-MESSENDER FREQUENZ	ANZEIGE-FREQUENZ DURCH VOR-EINSTELLUNG	VORBEREITUNG	ABGLEICH-SPUNKTE	ABGLEICHSVERFAHREN
	MW-HF-ABGLEICH					
1	Einen MW-Signal-generator über einen 200pF Kondensator mit dem MW-Antenne-neingang verbinden. Die gemeinsame Leitung mit dem Chassis verbinden. (Schwacher Eingang)	612kHz (400Hz Modulat., 30%)	612kHz	Oszilloskop oder Wechselstrom-Volt-meter uber den Lautsprecher schließen	L201 (Ant. Spule)	1. Auf max. Ausgang abgleichen 2. Den Ferritkern von L201 mit einem Schraubendreher justieren.
2		1503kHz (400Hz Modulat., 30%)	1503kHz		CT201 (Ant. Trimmer)	1. Auf max. Ausgang abgleichen. 2. Die Schritte (1) und (2) wied-erholen, bis die Frequenz genau mit der Skalenanzeige übereinstimmt.

FM (UKW)-EINSTELLUNG

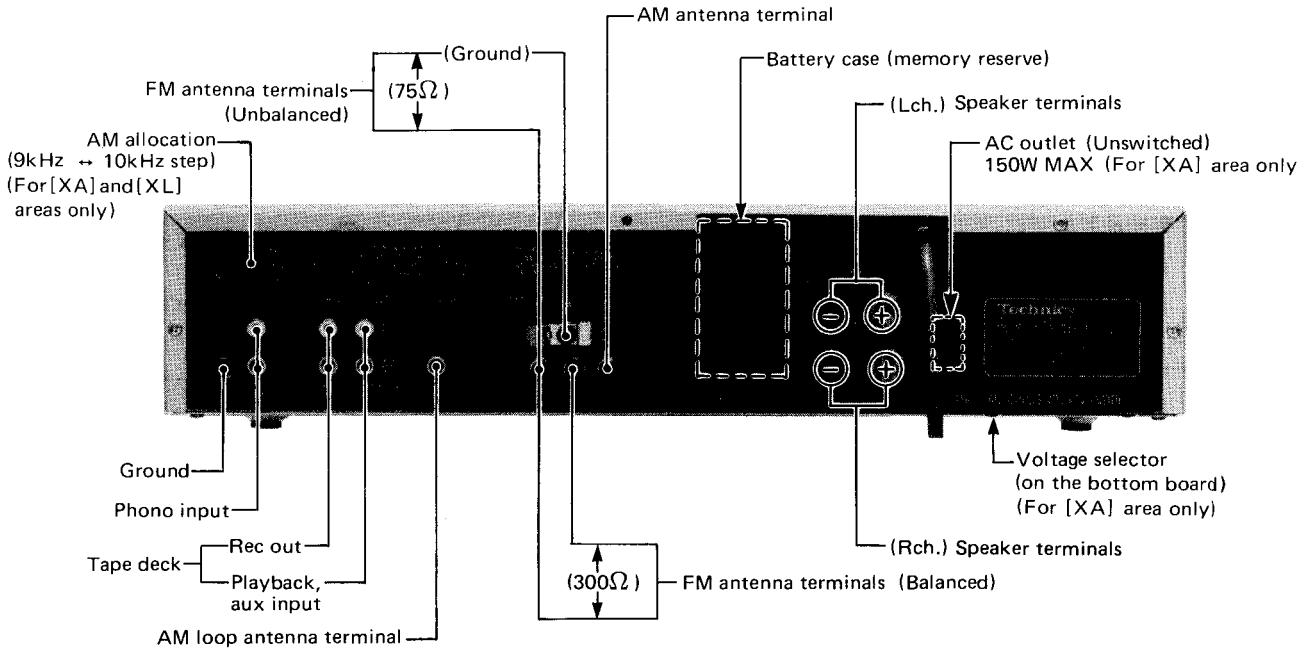
• Stellungen und zu benutzenden Geräte

1. UKW-Meßsender (FM-SG)
2. Verzerrungsmesser
3. Elektronische Voltmeter für Wechsel-und Gleichstrom (VTVM)
4. Signalfrequenzmesser (meßar für 19kHz und 108MHz)
5. Bereichsschalter . . . . . FM
6. Den UKW-Betriebsartenschalter auf die "mono"-position stellen.
7. Die anderen Einstellungen sind gleich wie beider MW-Justierung.
8. Stereo-Modular (oder Trennmesser)

*** Vorbereitung des UKW-Meßoszillators (UKW-MO)**

1. Die Normal-Eingangs eistung dieses Gerätes beträgt 60 dB (1mV), 400Hz, 100% Modulation. (Wegen der Dämpfung bei Verwendung von Koaxialka beln, muß die MO-Ausgangsleistung 6dB oder mehr (IHF) betragen; d. h. wenn die Eingangsleistung 60dB beträ t, muß der MO-Ausgang 66dB betragen.)

Nr.	FM (UKW) MESSENDER ANSCHLUSS	FM (UKW) MESSENDER FREQUENZ	ANZEIGE-FREQUENZ DURCH VOR-EINSTELLUNG	VORBEREITUNG	ABGLEICH-SPUNKTE	ABGLEICHSVERFAHREN
	ABGLEICH AUF MIN. VERZERRUNG IN STELLUNG UKW-MONO					
3	FM-SG an den FM-Antennenanschluß entsprechend Abb. 17. (60dB an den Antennenanschluß legen.)	100.1MHz (400Hz Modulat., 100%)	100.1MHz	Ein Gleichstromrören-voltmeter zwishen TP203 und TP204 über eine Drosselspule verbinden. (Siehe Abb. 17)	T202 (Diskriminator FT)	1. Den Kern von T202 so justieren, daß die gemessene Spannung im signallosen Modus 0mV im 300mV Bereich beträgt.
4		100.1MHz (400Hz Modulat., 100%)	100.1MHz	Klirrfaktor-Meßbrücke uber den Lautsprecher schließen	T203 (Diskriminator FT)	1. T203 Kern für minimale Verzerrung der rechten und linken Kanäle justieren.



- The power supply for this unit varies depending upon the areas. Also, the parts used for power supply are different. So, refer to the circuit diagram and the replacement parts list.

* [XA] area is provided with voltage selector and AC outlet.
* 240V (50/60Hz) for Australia.
* 220V((50/60Hz) for Continental Europe.
* 110V/120V/220V/240V (50/60Hz) for other [XA] area.
* [XA] and [XL] areas are provided with AM allocation switch.
* Phono input capacitance is about 150pF.

■ PROTECTION CIRCUITRY

The protection circuitry may have operated if eigher of the following conditions is noticed:

- No sound is heard when the power is turned on.
- Sound stops during performance.

The function of this circuitry is to prevent circuitry damage if, for example, the positive and negative speaker with an impedance less than the indicated rated impedance of the amplifier are used.

If this occurs, follow the procedure outlined below:

1. Turn off the power.
2. Determine the cause of the problem and correct it.
3. Turn on the power once again

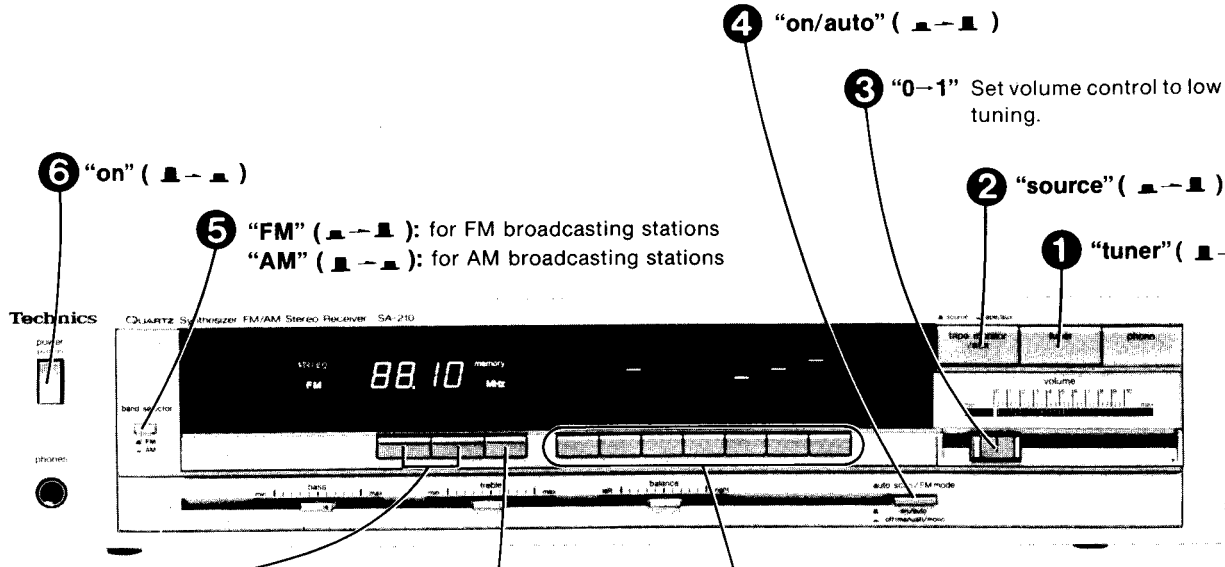
Note:
When the protection circuitry functions the unit will not operate unless the power is first turned off and then on again.

■ BEFORE REPAIR AND ADJUSTMENT

1. Turn off the power supply and short-circuit of the power supply capacitors (C702, C703, 4700μF) with a resistor (about 10Ω, 5W) to discharge the charged voltage. Do not short both ends of C702 and C703 with a screwdriver. It may damage the component.
2. Before turning on the power supply after completion of repair, slowly apply the primary voltage by using a power supply voltage controller to make sure that the consumed current is free of abnormality. The consumed current at 60Hz/50Hz in no signal mode is shown below with respect to supply voltage 110V/120V/220V/240V.

Power supply voltage		AC110V	AC120V	AC220V	AC240V
Consumed current	50 Hz	120 ~ 420mA	110 ~ 410mA	60 ~ 210mA	50 ~ 200mA
	60 Hz	110 ~ 410mA	100 ~ 400mA	50 ~ 200mA	40 ~ 190mA

■ HOW TO PRESET RADIO BROADCAST FREQUENCIES


❹ "on/auto" (▲—▲)
❸ "0—1" Set volume control to low position for easier tuning.
❻ "on" (▲—▲)
❷ "source" (▲—▲)
❺ "FM" (▲—▲): for FM broadcasting stations
"AM" (▲—▲): for AM broadcasting stations
❶ "tuner" (▲—▲)
Technics
QUARTZ Synthesizer FM/AM Stereo Receiver SA-210
88.10
volume

❼ **Press one of the tuning buttons.**
(The broadcast station will automatically be selected.)
Note:
If automatic selection can not be made, set the automatic-scan/FM mode selector to the "off (manual)/mono" position and then tune manually.

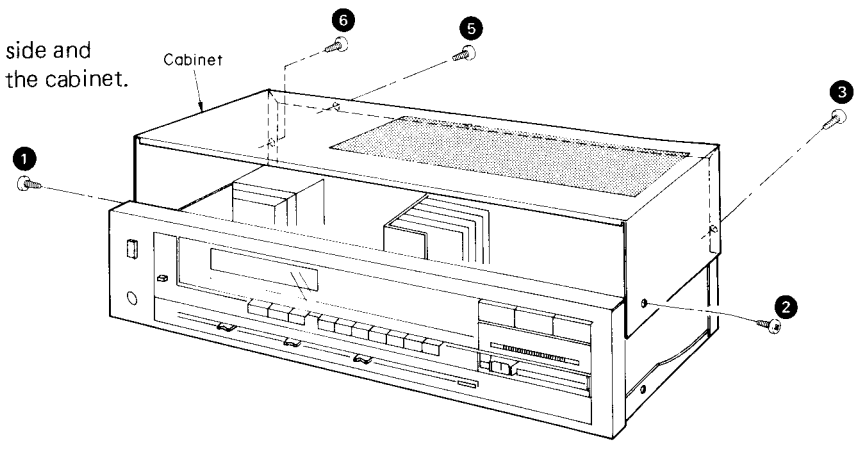
❽ **Press the memory button.**
(The memory indicator will illuminate for about 5 seconds.)

❾ **While the memory indicator is illuminated, press the preset-tuning button (1~7) which you want to use for that station.**
When the button is pressed, the memory indicator illumination will stop, and the presetting is complete.
Note:
If the memory indication illumination stops before you press the button, once again repeat step (8) and then step (9).

■ DISASSEMBLY INSTRUCTIONS

- **How to remove the cabinet**

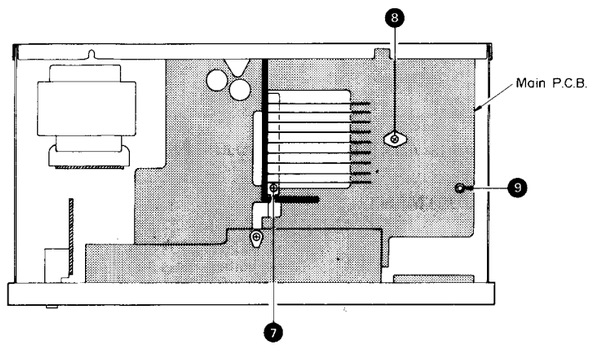
1. Remove the 2 setscrews (Fig. 1: ❶ ❷) on the side and 3 setscrews (Fig. 1: ❸, ❺, ❻) on the back of the cabinet.
2. Remove the cabinet upward.



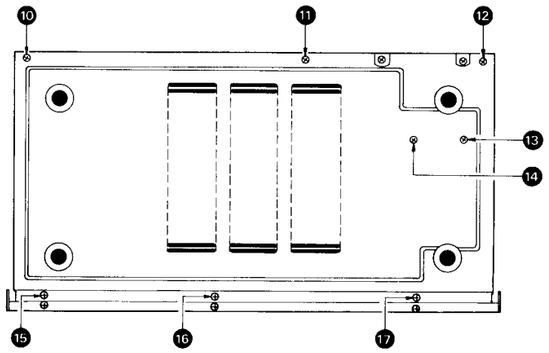
[Fig. 1]

• How to remove the bottom board

1. Remove the 2 setscrews (Fig. 2: ❼ ❽) and lock pin (Fig. 2: ❾) which secure the main P.C.B. from inside the set.
2. Remove the 8 setscrews (Fig. 3: ❿ ~ ⓱) of the bottom board.
3. Remove the bottom board.



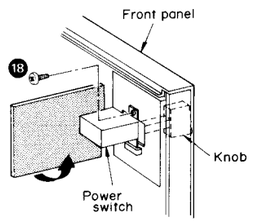
[Fig. 2]



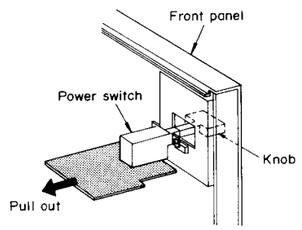
[Fig. 3]

• How to remove the power switch.

1. Remove the setscrew (Fig. 4: ⓲) of the power switch.
2. Next, lay down the power switch P.C.B. as shown in Fig. 5, and remove the power switch from the front panel.



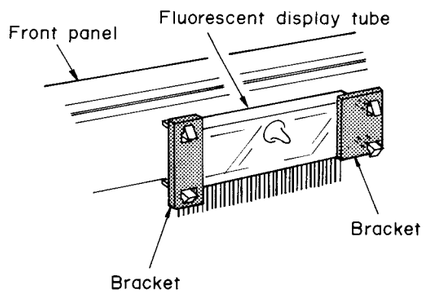
[Fig. 4]



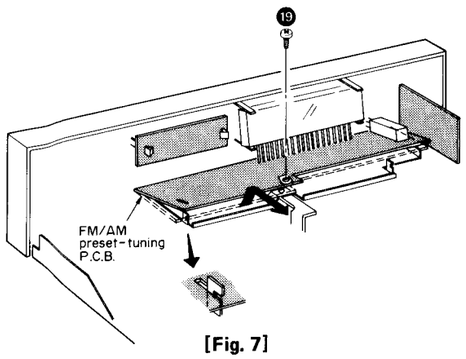
[Fig. 5]

• How to remove the front panel

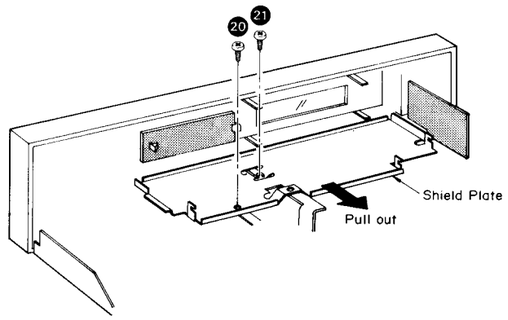
1. Remove the cabinet.
2. Remove the 2 brackets (Fig. 6) of the fluorescent display tube.
3. Remove the setscrew (Fig. 7: ⓳) of the FM/AM preset-tuning P.C.B., and then detach the FM/AM preset-tuning P.C.B.
4. Remove the 2 setscrews (Fig. 8: ⓴ ㉑) of the shield plate, and then detach the shield plate.
5. Remove the 3 input selector knobs by pushing them from inside the front panel by use of a screwdriver or the like. (Refer to Fig. 9)
6. Remove the 3 setscrews (Fig. 3: ⓯~ ⓱) which secure the front panel from the bottom.
7. Next, release the side claws of the front panel to pull out the front panel toward you. (Fig. 10)



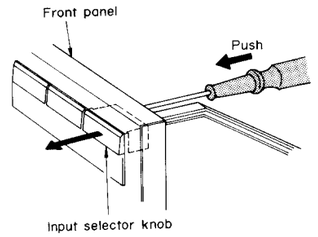
[Fig. 6]



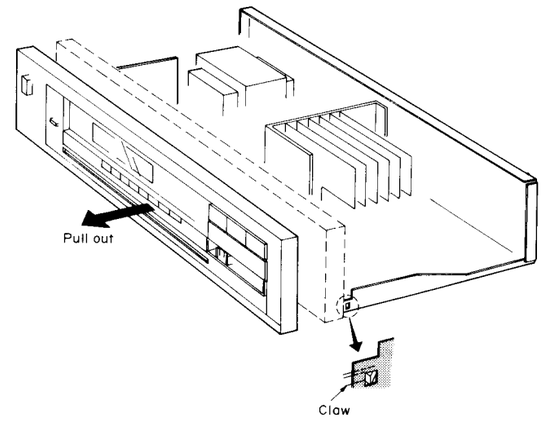
[Fig. 7]



[Fig. 8]



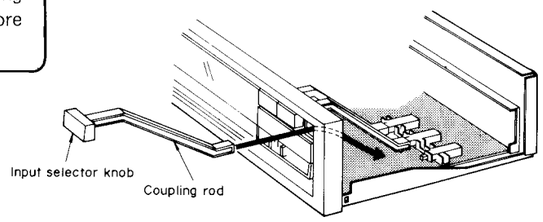
[Fig. 9]



[Fig. 10]

NOTE

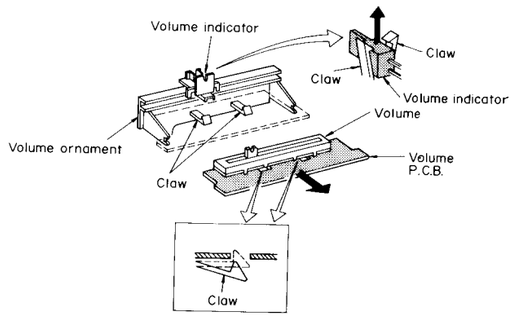
To set the input selector knob, fit the knob to the coupling rod as in Fig. 11, and set it through the front panel before attaching it to the switch.



[Fig. 11]

• How to remove the volume P.C.B. and volume indicator

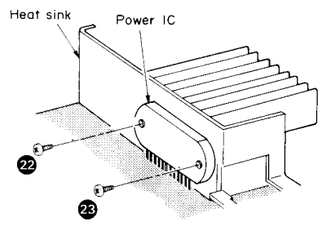
1. The volume P.C.B. is secured with the 2 claws projected from the volume ornament. So, release the claws with a screwdriver, and pull out the volume P.C.B. as shown in Fig. 12.
2. When removing the volume indicator, release the 2 claws which secure the volume indicator, and then remove the indicator upward. In this case, do not bend the claws excessively.



[Fig. 12]

• How to remove the power amplifier IC

1. Remove the cabinet and bottom board.
2. Unsolder of power IC.
3. Remove the 2 setscrews (Fig. 13: ㉒ ㉓) used to secure the power IC on the heat sink, and then pull the power IC.
4. When mounting the power IC, apply silicone compound or equivalent heat diffuser to the rear side of power IC, and then follow the steps 1~4 reversely.



[Fig. 13]

• How to replace chips (resistors)

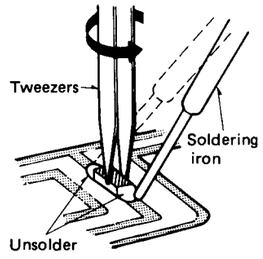
1. Unsolder from chip by using solder sucker.
2. Remove chip with tweezers by rotating it while removing solder as shown in Fig. 14.
3. Solder circuit board first and then solder chip in the direction of the arrow as shown in Fig. 15.

Notes:

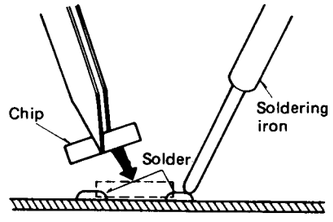
1. Do not use chip again which is removed from printed circuit board.
2. Use lead wire with insulator for replacement instead of chip jumper.

• Note for replacing chips

1. Do not heat chips more than three (3) seconds.
2. Be careful not to damage the electrode of chips.
3. Use soldering iron (less than 60W) and tweezers for replacing chips.



[Fig. 14]



[Fig. 15]

■ MEASUREMENTS AND ADJUSTMENTS

Note: AM OSC coil (L202) and AM IFT (T201) have been already adjusted, and require no adjustment.

AM ADJUSTMENT

*** Setting and Equipment used**

1. AC electronic voltmeters (VTVM)
2. AM signal generator (AM-SG)
3. Set Band selector to "AM" position.
4. Maintain line voltage at rated voltage.
5. Output of signal generator should be no higher than necessary to obtain an output reading.
6. Use a non-metal screwdriver for the adjustment.
7. Set AM allocation selector to "AM 9kHz step" position. (For [XA], [XL] areas only)

Step No.	AM SIGNAL GENERATOR CONNECTION	AM SIGNAL GENERATOR FREQUENCY	DISPLAY FREQUENCY	PREPARATIONS	PARTS ADJUSTED	ADJUSTING PROCEDURE
	AM-RF ADJUSTMENT					
1	Connect AM-SG to AM antenna terminal through 200pF capacitor referring to Fig. 16. (Weak input)	612kHz (30% Mod. with 400Hz)	612kHz	Connect AC VTVM or scope to "speaker" terminal of the set.	L201 (ANT Coil)	1. Adjust for maximum output. 2. Adjust core of L201 by screwdriver.
2		1503kHz (30% Mod. with 400Hz	1503kHz	Connect AC VTVM or scope to "speaker" terminal of the set.	CT201 (ANT Trimmer)	1. Adjust for maximum output. 2. Repeat steps (1) and (2) until the frequency correctly matches the frequency display.

FM ADJUSTMENT

*** Setting and Equipment used**

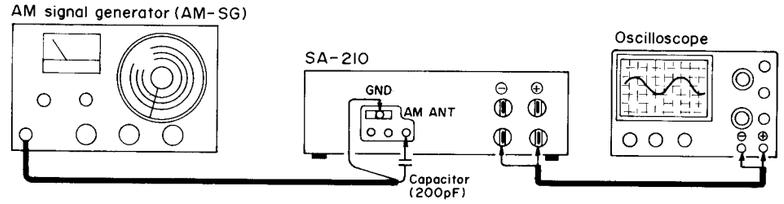
1. FM signal generator (FM-SG)
2. Oscilloscope.
3. Distortion analyser.
4. DC electronic voltmeters (VTVM).
5. Frequency counter (19kHz and 108MHz measurable).
6. Set band selector to "FM" position.
7. Set Automatic-scan/FM mode selectot to "off/mono" position.
8. Other setting are the same as in AM adjustment.

*** Preparation of FM signal generator (FM-SG)**

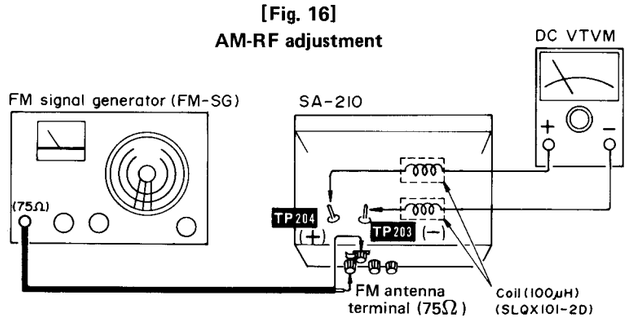
1. The standard input of the set is 60dB(1mV), 400Hz 100% modulation.
   (Because of attenuation, using coaxial cables. SG output must be 6dB plus (IHF). That is, when input 60dB, SG output is to be 66dB.)

Step No.	FM SIGNAL GENERATOR CONNECTION	FM SIGNAL GENERATOR FREQUENCY	DISPLAY FREQUENCY	PREPARATIONS	PARTS ADJUSTED	ADJUSTING PROCEDURE
	FM MONO DISTORTION ADJUSTMENT					
3	Connect FM-SG to FM antenna terminal referring to Fig. 17. (Apply 60dB to antenna terminal)	100.10 MHz (100% Mod. with 400 Hz)	100.10 MHz	Connect DC VTVM to between TP203 and TP204 through choke coil. (Refer to Fig. 17)	T202 (Discri. IFT)	1. Adjust T202 core so that voltage measured in signal mode is 0mV in 300mV range. 2. Adjust T203 core so that distortion of right and left channels are minimized.
4		100.10 MHz (100% Mod. with 400 Hz)	100.10 MHz	Connect distortion analyser to "speaker" terminal of the set.	T203 (Discri. IFT)	

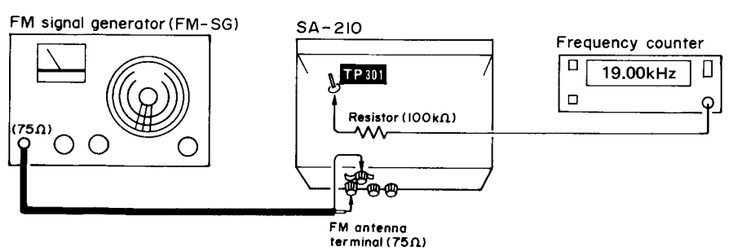
Step No.	USING A FREQUENCY COUNTER	USING ALTERNATE SYSTEM
	FM MPX PILOT (VCO) ADJUSTMENT	
5	1 100.10MHz 60 dB Non-modulated mono signal applied to set. (Refer to Fig. 18) 2. Set Automatic-scan/FM mode selector to "on/auto" position. 3. Connect frequency counter to TP301 through resistor (100kΩ). 4. Adjust **VR301** to 19kHz ± 30Hz.	1. Apply stereo signal from generator or stereo station to tuner. 2. Adjust **VR301** until stereo indicator lights up. Cement arm of **VR301** as shown in Fig. 19.



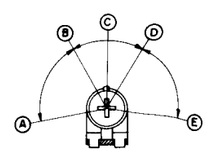
[Fig. 16]
AM-RF adjustment



[Fig. 17]
FM-IF adjustment



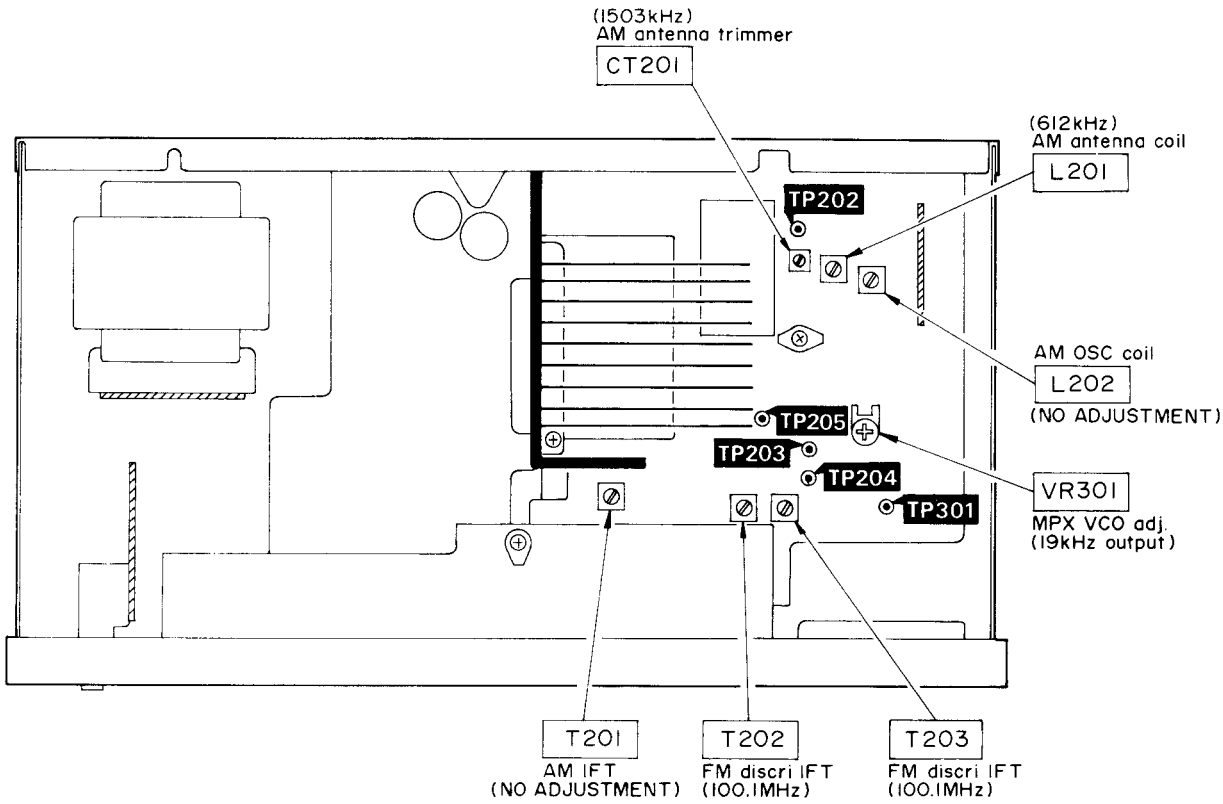
[Fig. 18] **FM MPX PILOT (VCO) adjustment**



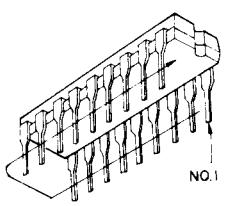
A–B, D–E Stereo OFF Position.
B–D Stereo ON Position. (indicator Lighting)
C Adjust Point of Pilot Circuit.

[Fig. 19]

• **Adjustment points**

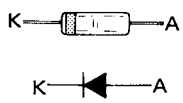


■ TERMINAL GUIDE OF TRANSISTORS, DIODES AND IC'S

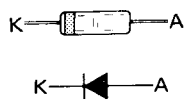


AN6873N	18pin
AN7273A	
SVID1703C018	28pin
SVIμPB553C-E	8pin
SVINJ4559DDM	
SVIμPC1161C3	16pin

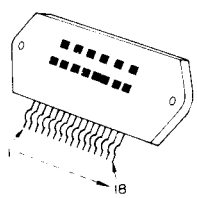
MA150TA



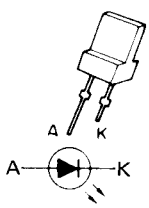
MA27WA



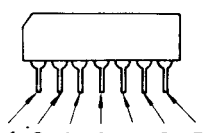
SVIK4141-2M



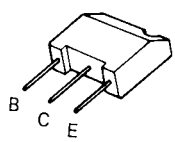
LN224RP



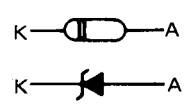
AN7072N



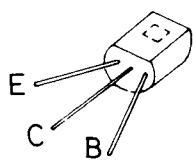
2SD636



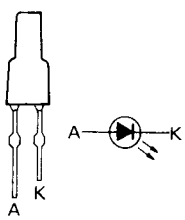
SVDMZ□□□□



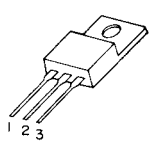
2SA564A, 2SA992, 2SC829, 2SC945, 2SC1685



LN346GR, LN846RP LN446YP,

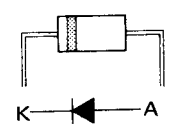


AN7812

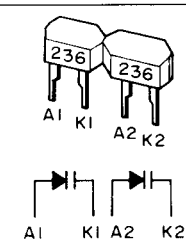


1. Voltage in
2. GND
3. Voltage out

SVDS2V20, SVDSR1K2

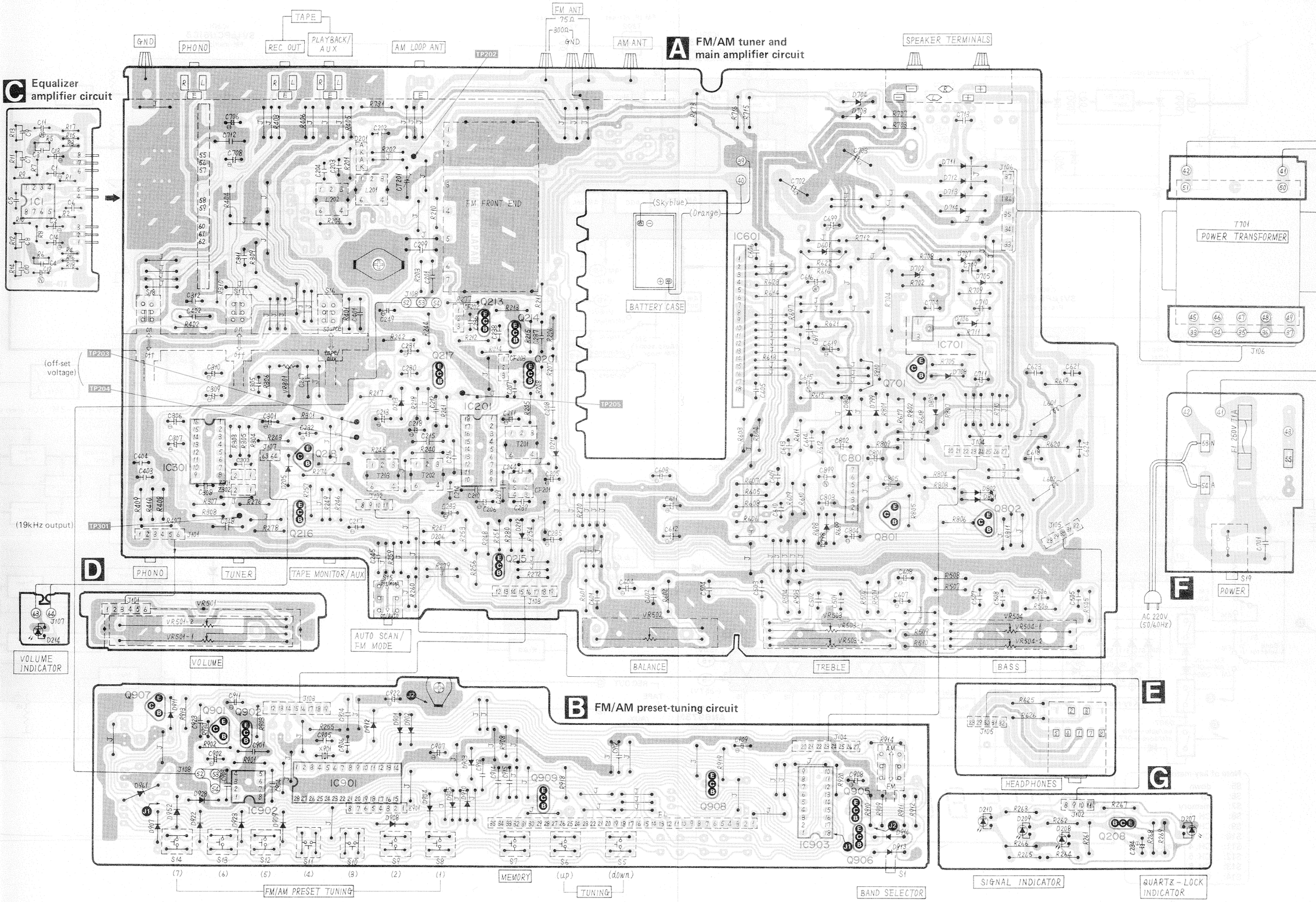


SVDKV1236Z



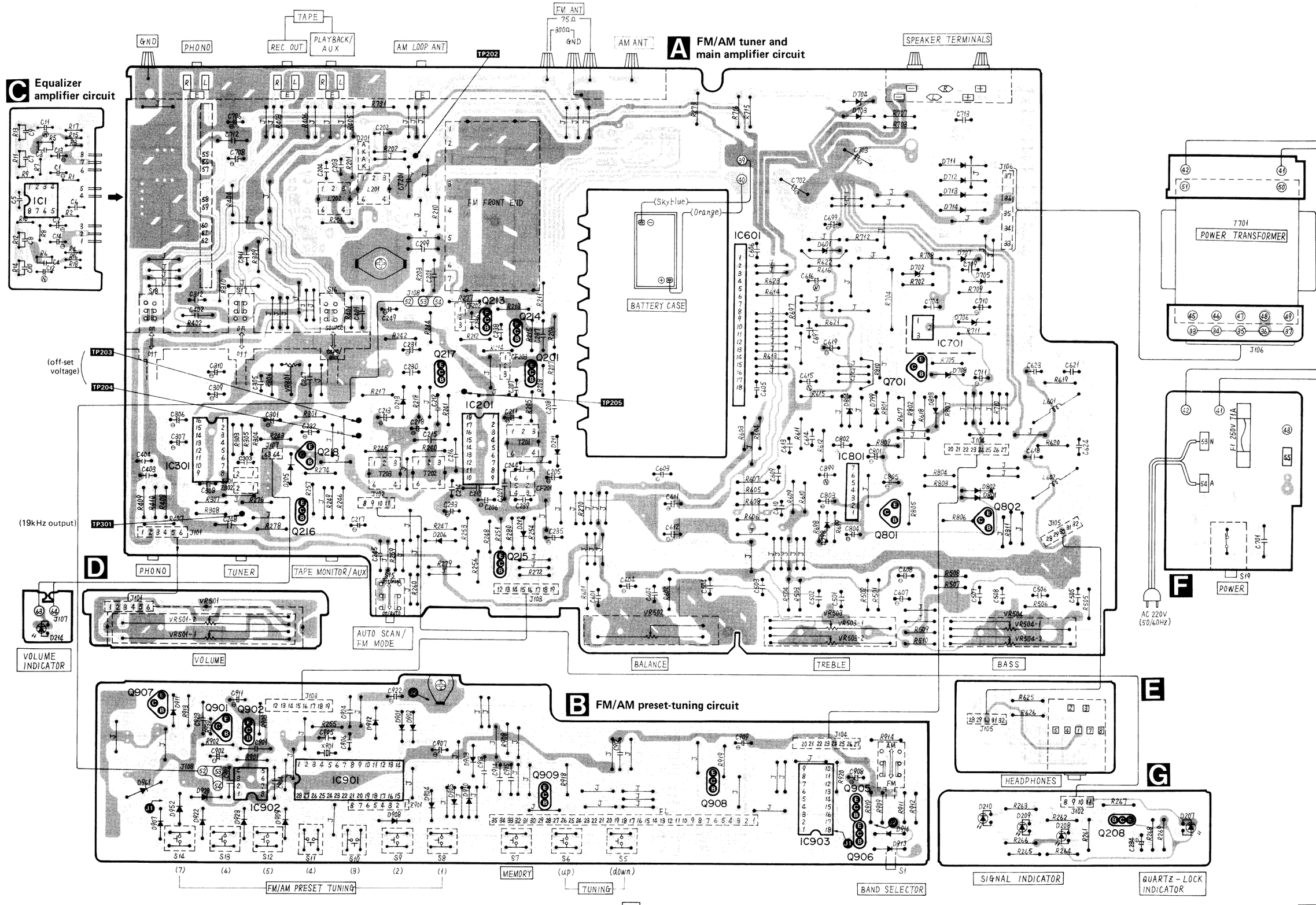
■ PRINTED CIRCUIT BOARD

Ground (Earth) lines



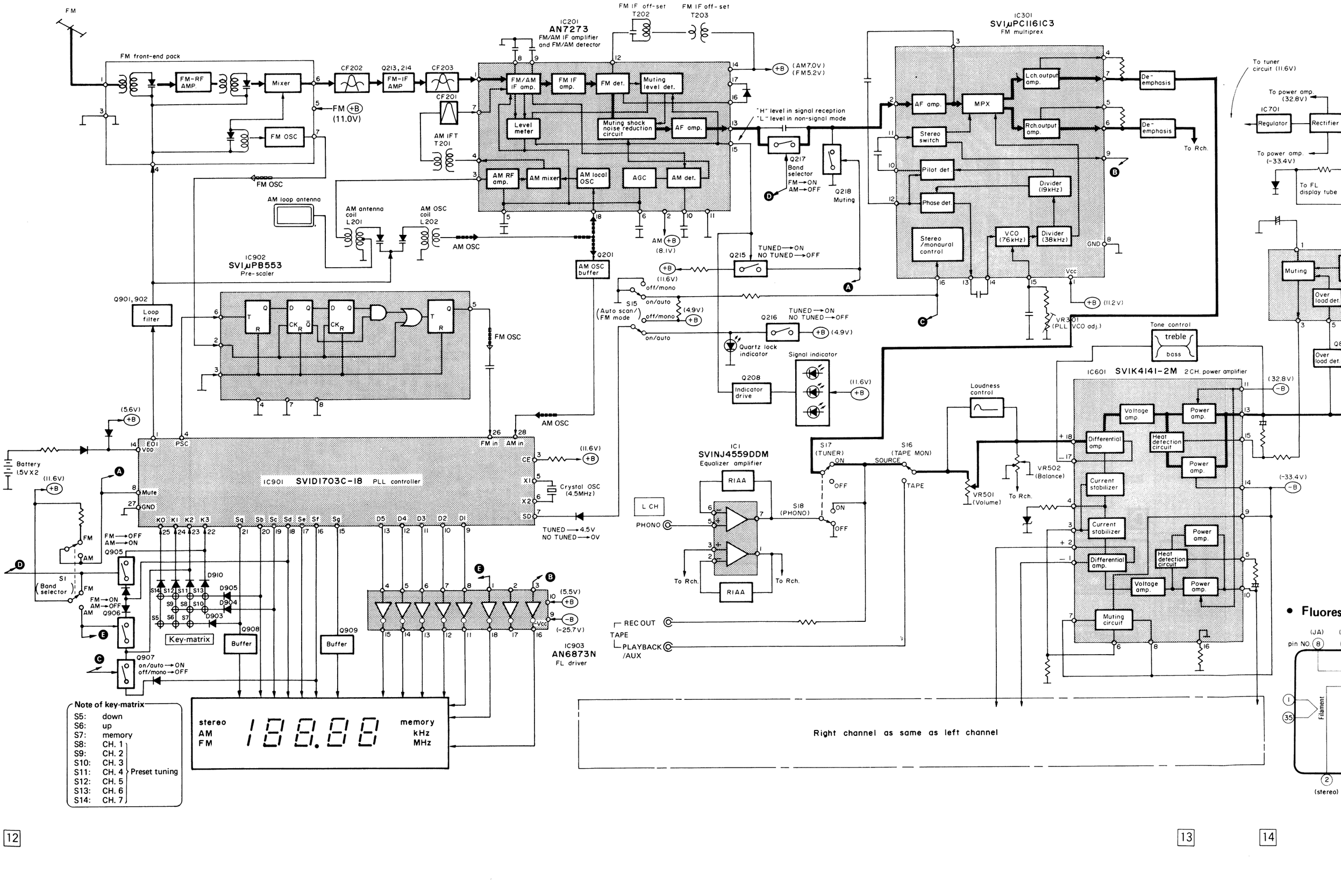
■ PRINTED CIRCUIT BOARD

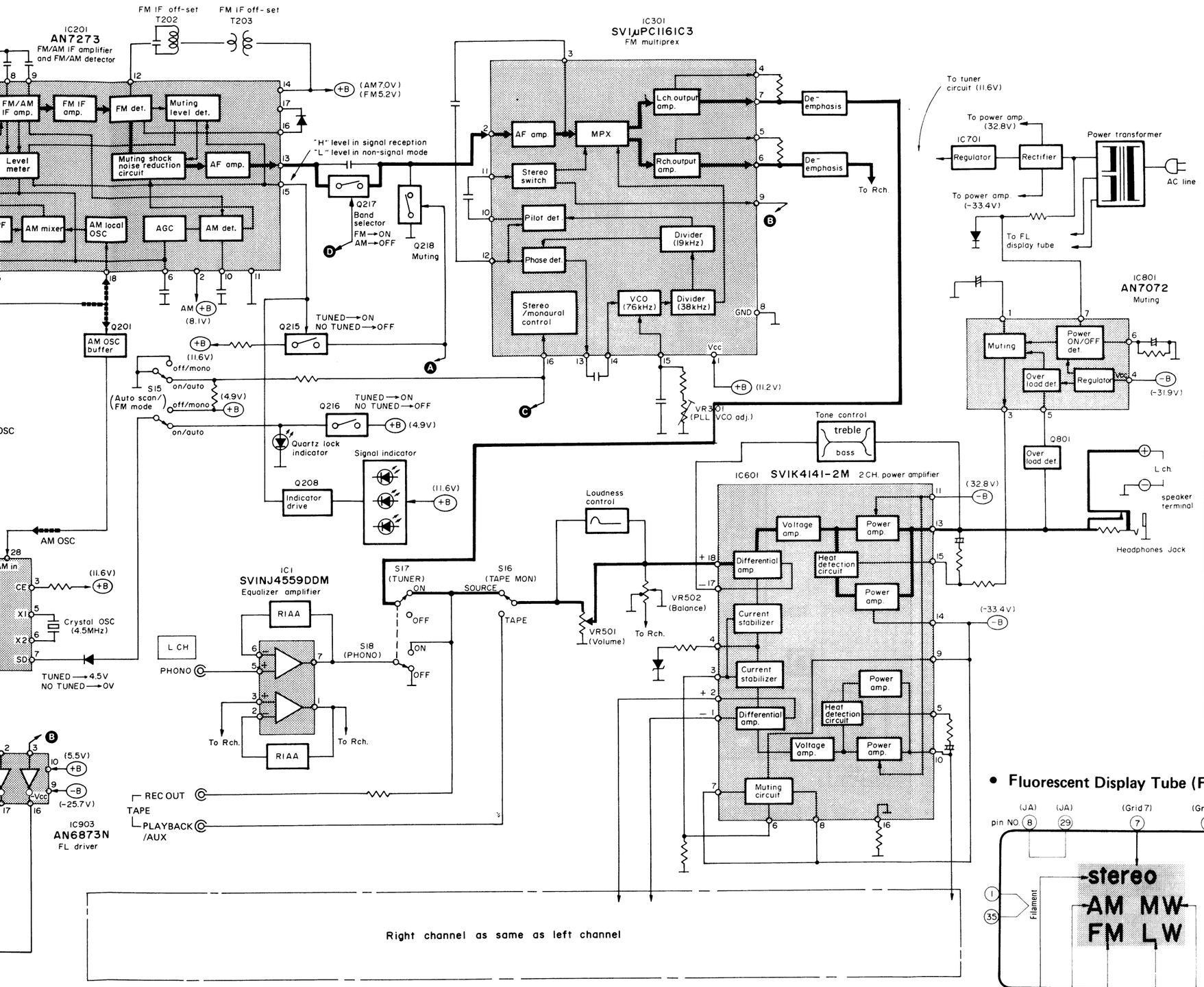
Ground (Earth) lines



SA-210 SA-210

■ BLOCK DIAGRAM





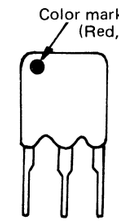
- **Operational description of IC (IC801) for muting (with power on/off, overload)**

1. Muting operation with power ON.
   With power turned ON, AC voltage is applied to terminal ⑦ of IC801. Then, condenser C604 connected to terminal ① is charged, and the voltage of terminal ① gradually rises. When the voltage reaches about –4V (about 5 sec. after power ON), the muting circuit turns off, and then –30.6V is generated at terminal ③. The voltage of terminal ③ is supplied to the voltage amplifier circuit of IC601, thus operating power IC.
2. Muting operation with power OFF.
   With power turned OFF, condenser C604 connected to terminal ① is discharged, causing the voltage of C604 to drop, and then the muting circuit in IC turns ON. With the muting circuit turned ON, the voltage of terminal ③ becomes 0V, and then power supply to the voltage amplifier circuit of IC601 is discontinued.
3. Muting operation with power amplifier over-loaded.
   With speaker terminals short-circuited, a large quantity of current flows into R617 (R618), causing the voltage rise. The voltage causes Q801 (Q802) to turn ON, and then overload detecting signal is applied to terminal ⑤. When the potential difference between terminals ④ and ⑤ reaches about 0.7V, condenser C604 is discharged the same as for muting operation with power OFF. As a result, the muting circuit turns ON and the voltage of terminal ③ becomes 0V.

NOTE

- **Use of ceramic filters in pairs**

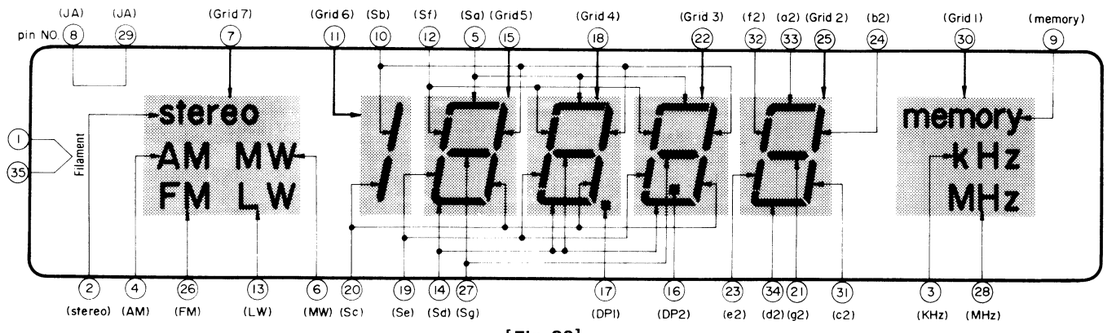
The ceramic filters (CF202, CF203) for FM-IF circuit are available in three ranks. For this machine, be sure to use the ceramics of the same rank in a pair.
At repairing and replacement, pay close attention to the diodes (D907, D908) for use as different diodes must be used depending on each rank of the ceramic filters.



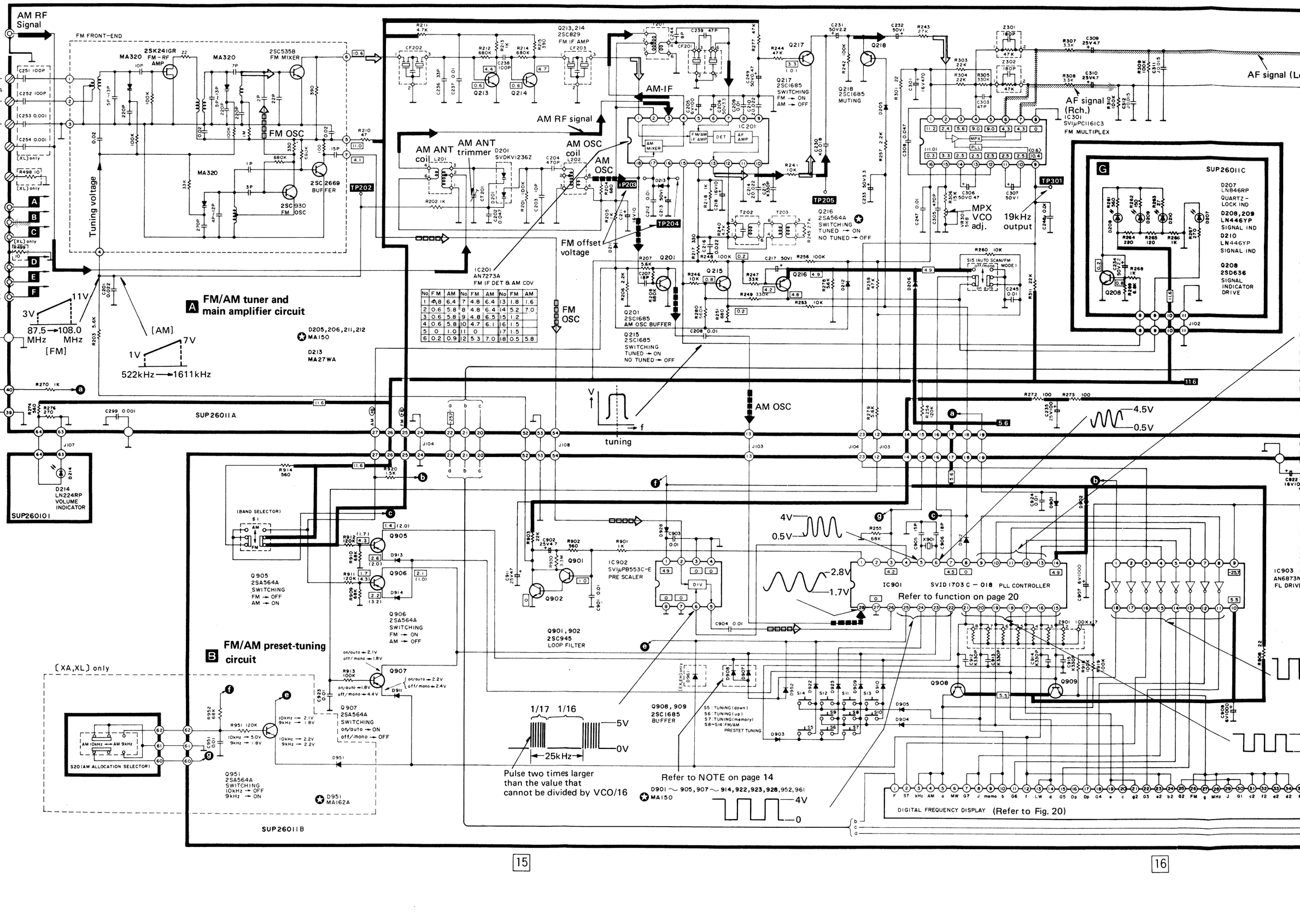
RANK (color)	D907	D908	CENTER FREQUENCY
Red	X	X	10.70 MHz
Orange	X	O	10.73 MHz
Blue	O	O	10.67 MHz

Notes: O Mark Doide is used.
X Mark Diode is not used.

- **Fluorescent Display Tube (FL)**


pin NO
(JA) (JA) (Grid 7) (Grid 6) (Sb) (Sf) (Sa) (Grid5) (Grid 4) (Grid 3) (f2) (a2) (Grid 2) (b2) (Grid 1) (memory)
8 29 7 11 10 12 5 15 18 22 32 33 25 24 30 9
Filament
1 35
stereo
AM MW
FM LW
memory
kHz
MHz
2 4 26 13 6 20 19 14 27 17 16 23 34 21 31 3 28
(stereo) (AM) (FM) (LW) (MW) (Sc) (Se) (Sd) (Sg) (DPI) (DP2) (e2) (d2) (g2) (c2) (KHz) (MHz)

[Fig. 20]


AM LOOP ANT
FM ANT
GND
AM ANT
GND
L ch
PHONO
REC OUT
TAPE PLAYBACK /AUX
R ch
PHONO
REC OUT
TAPE PLAYBACK /AUX
AM RF Signal
FM FRONT-END
2SK241GR FM-RF AMP
MA320
2SC535B FM MIXER
FM OSC
2SC2669 BUFFER
2SC930 FM OSC
Tuning voltage
AM-IF
AM RF signal
AM ANT coil
AM ANT trimmer
D201 SVDKV1236Z
AM OSC coil
AM OSC
IC201 AN7273A FM IF DET & AM COV
FM offset voltage
FM OSC
Q213,214 2SC829 FM IF AMP
Q217 2SC1685 SWITCHING FM → ON AM → OFF
Q218 2SC1685 MUTING
Q216 2SA564A SWITCHING TUNED → ON NO TUNED → OFF
Q201 2SC1685 AM OSC BUFFER
Q215 2SC1685 SWITCHING TUNED → ON NO TUNED → OFF
IC301 SVIμPC1161C3 FM MULTIPLEX
MPX VCO adj.
19kHz output
AF signal (Rch.)
AF signal (L
11V
3V
87.5→108.0 MHz
[FM]
[AM]
7V
1V
522kHz→1611kHz
A FM/AM tuner and main amplifier circuit
D205,206,211,212 MA150
D213 MA27WA
BATTERY 1.5V x 2
SUP260111A
AM OSC
tuning
G
SUP260111C
D207 LN846RP QUARTZ-LOCK IND
D208,209 LN446YP SIGNAL IND
D210 LN446YP SIGNAL IND
Q208 2SD636 SIGNAL INDICATOR DRIVE
D214 LN224RP VOLUME INDICATOR
SUP260101
(BAND SELECTOR)
Q905 2SA564A SWITCHING FM → OFF AM → ON
Q906 2SA564A SWITCHING FM → ON AM → OFF
Q907 2SA564A SWITCHING on/auto → ON off/mono → OFF
B FM/AM preset-tuning circuit
〔XA,XL〕only
S20(AM ALLOCATION SELECTOR)
Q951 2SA564A SWITCHING 10kHz → OFF 9kHz → ON
D951 MA162A
SUP260111B
Q901 2SC945 LOOP FILTER
Q902 2SC945 LOOP FILTER
IC902 SVIμPB553C-E PRE SCALER
Q908,909 2SC1685 BUFFER
S5 : TUNING (down)
S6 : TUNING (up)
S7 : TUNING (memory)
S8~S14 : FM/AM PRESTET TUNING
IC901 SVID1703C-018 PLL CONTROLLER
Refer to function on page 20
Refer to NOTE on page 14
D901 ~ 905,907 ~ 914,922,923,928,952,961 MA150
DIGITAL FREQUENCY DISPLAY (Refer to Fig. 20)
IC903 AN6873N FL DRIVE
4.5V
0.5V
4V
0.5V
2.8V
1.7V
1/17 1/16
5V
0V
25kHz
Pulse two times larger than the value that cannot be divided by VCO/16

AF signal (Lch.)

AF signal (Rch.)
IC301
SVIμPC1161C3
FM MULTIPLEX

MPX VCO adj.

19kHz output

TP301

SUP26011C

D207 LN846RP QUARTZ-LOCK IND

D208,209 LN446YP SIGNAL IND

D210 LN446YP SIGNAL IND

Q208 2SD636 SIGNAL INDICATOR DRIVE

5.2ms
4.8V
0.3V
0.7ms

4.5V
0.5V

-5V
-24V

-5V
-24V

IC901 SVID1703C-018 PLL CONTROLLER

Refer to function on page 20

IC903
AN6873N
FL DRIVER

DIGITAL FREQUENCY DISPLAY (Refer to Fig. 20)

SUP26011A

Equalizer amplifier circuit

SUP24311

IC1
SVINJ4559DDM
EQUALIZER AMP

A (PHONO Lch)
B REC OUT Lch
C (PLAYBACK Lch)
D (PHONO Rch)
E (REC OUT Rch)
F (PLAYBACK Rch)

SUP26011D

S18 (PHONO)
S17 (TUNER)
S16 (TAPE MONITOR/AUX)

Q701 2SC1685 REGULATOR

IC601
SVIK4141-2M
2CH POWER AMP

1	-0.1	7	-33.4	13	0
2	-0.1	8	-33.4	14	-33.4
3	0	9	-33.4	15	-1.3
4	-7.9	10	0	16	0
5	-1.3	11	32.8	17	-0.1
6	0	12	31.4	18	-0.1

D601
SVDMZ308B

IC801 AN7072N
MUTING & PROTECTION

D799
SVDSRIK2

Q801,802
2SA992
OVER LOAD DET

Q801,802,803,798
MA150

IC701
AN7812
REGULATOR

D702
SVDMZ303B
3V ZENER

D706
SVDMZ306B
6V ZENER

D711~714
SVDS2V20
RECTIFIER

Power source circuit

D708
SVDMZ306C1
6V ZENER

D704
SVDMZ314C
14V ZENER

D703
MA1160M
16V ZENER

D707
SVDMZ322A
22V ZENER

D705
SVDSRIK2
RECTIFIER

SUP26011H

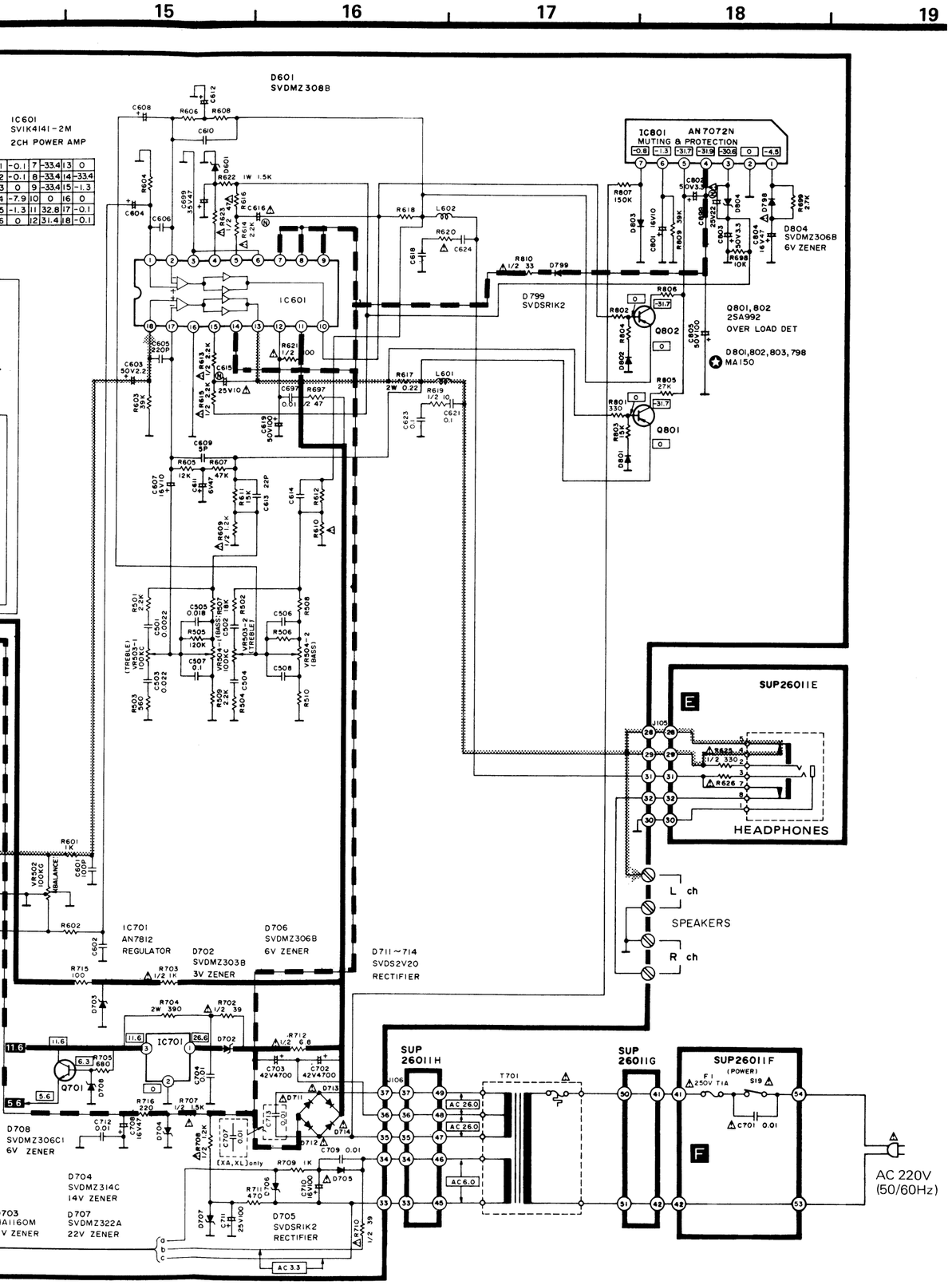
SUP26011G

SUP26011F
(POWER)

T701

L ch
SPEAKERS
R ch

HEADPHO



17

■ SCHEMATIC DIAGRAM

(This schematic diagram may be modified at any time with the development of new technology.)

*The part No. of transistors, IC and diodes mentioned in the schematic diagram stand for production part No. Regarding the part No. with ✪ mark, the production part No. are different from the replacement part No. Therefore, when placing an order for replacement part, please use the part No. in the replacement part list.

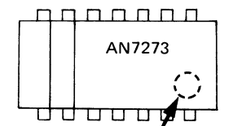
Notes:

1. **S1:** Band selector switch in "**FM**" position.
   FM ↔ AM
2. **S5, 6:** Tuning switch
   [S5 – down (tuning to lower frequency)
   S6 – up (tuning to higher frequency)]
3. **S7:** Memory switch. (manual ↔ auto)
4. **S8 ~ 14:** Preset tuning switch.
   [S8 – CH. 1 S11 – CH. 4 S14 – CH. 6
   S9 – CH. 2 S12 – CH. 5
   S10 – CH. 3 S13 – CH. 6]
5. **S15:** Automatic-scan/FM mode selector switch in "**on/auto**" position.
   on/auto ↔ off (manual)/mono
6. **S16:** Tape monitor/aux selector switch in "**source**" position.
   source ↔ tape/aux
7. **S17, 18:** Input selector switch in "**tuner**" position.
   [S17 – tuner
   S18 – phono]
8. **S19:** Power source switch in "**on**" position.
9. **S20 [XA, XL] only** : AM allocation selector switch in "**10kHz step**" position.
   9kHz step ↔ 10kHz step
   (Other areas are **9kHz** step.)
10. **S21 [XA] only** : Voltage selector switch in "**240V**" position.
    110V ↔ 120V ↔ 240V ↔ 220V
11. Important safety notice:
    Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
12. Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.
    * Figures in [ ] stand for DC voltage in FM signal mode.
    * Figures in < > stand for DC voltage in FM stereo signal reception mode.
    * Figures in ( ) stand for DC voltage in AM signal reception mode.
13. Positive voltage lines / AF signal lines / FM signal / FM IF / AM signal / AM IF / Negative voltage lines

NOTE

AN 7273 (IC201) is available in A rank (AN7273A) and B rank (AN7273B). Either rank can be used for this unit, but the suitable resistor must be used according to the rank as shown in the table below. So, keep this point in mind when repairing or replacing the unit.

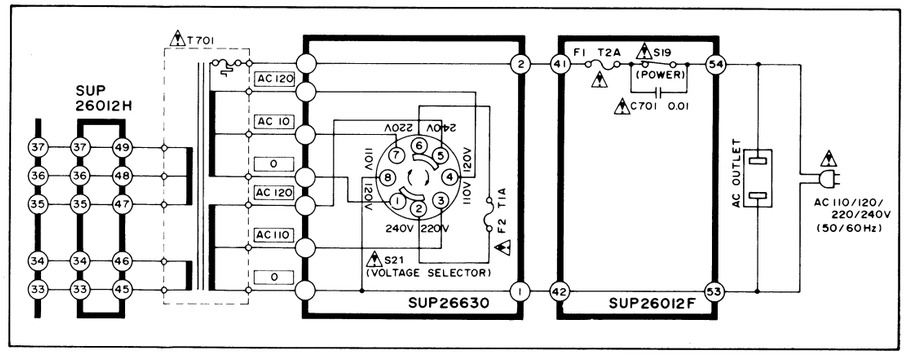
Ref.No. \ RANK	A	B
R211	4.7kΩ	1.8kΩ
R280	560kΩ	470kΩ



"A" painted in this position or red mark on main body stands for A rank, and similarly, "B" or green mark stands for B rank.

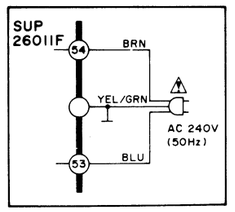
● Power source circuit

For [XA] area



* [XA] is available in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.

For [XL] area



* [XL] is available in Australia.

18

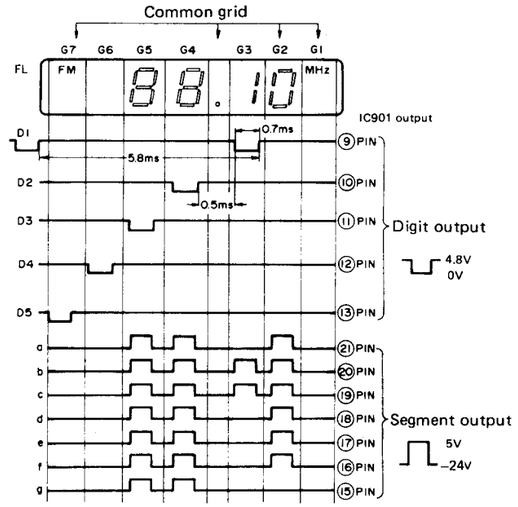
19

■ FUNCTION OF TERMINAL (PLL CONTROLLER IC901)

Terminal No.	Terminal	Description of terminal
1	E01 (Error out)	When the divided oscillation frequency is higher than the standard frequency, H-level output is delivered from these terminals. When it is lower, L-level (0V) output is delivered. When they coincide, it results in floating.
2	E02 (Error out)	
3	CE (Chip Enable)	This is the selected signal input terminal of the device. When operating the device, make the level high, and when it is not used, make the level low. When this terminal is at low level, all the segment (a ~ g) and digits (D1 ~ D5) terminals are off, but the memory is held.
4	PSC (Prescaler Control)	This is the terminal to deliver the frequency dividing ratio changeover output signal to the pre-scaler. The terminal continues to produce pulses at the rise of the signal applied to FM terminal (26) until the content of the inside swallow counter is 0. When the swallow counter comes to 0, the terminal level becomes low, then the frequency dividing ratio of pre-scaler is 1/16.
5	X1 (Crystal)	Connecting terminal for crystal oscillator. The crystal connected is at 4.5 MHz.
6	X2 (Crystal)	
7	SD (Station Detector)	This input terminal detects the reception of a broadcasting station. The voltage is 4.2V during reception, and otherwise 0V.
8	MUT (Muting)	This is the output terminal to eliminate shock noise due to unlocking at PLL. When the CE terminal is at low level, the output from this terminal is at high level.
9 ~ 13	D1 (Digit Outputs) ~ D5	Digit signal output terminal for display. (Refer to Fig. 20)
14	VDD	Power supply terminal of the device.
15 ~ 21	a (Segment Outputs) ~ g	Segment signal output terminal for display. (Refer to Fig. 20)
22 ~ 25	K3 (Key Return Signal Inputs) ~ K0	Input terminal for key return signal from external key matrix. The output of segment terminals (a ~ g) is used as the key return signal source. 4V / 0V

Terminal No.	Terminal	Description of terminal
26	FM (Pulse swallow oscillation input)	Input terminal for FM OSC output frequency-divided to 1/16 or 1/17 by pre-scaler. 2.8V / 1.6V (1.2V) 6 ~ 7 MHz
27	E (Ground)	Ground terminal
28	AM (Direct oscillation input)	Input terminal for AM OSC output. 2.8V / 1.7V (1.1V) 1 MHz ~ 2 MHz

Digits and segment output voltage of IC901 (PLL controller)



[Fig. 20]

■ RESISTORS & CAPACITORS

Notes:
1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
3. The "**S**" mark is service standard parts and may differ from production parts.
4. The unit of resistance is Ω. (ohm). K = 1000Ω, M = 1000kΩ.
5. The unit of capacitance is μF. (microfarad). P = 10^{-6} μF.
6. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.

Numbering System of Resistor

Example

ERD	25	F	J	101
Type	Wattage	Shape	Tolerance	Value

ERG	2	AN	J	2R2
Type	Wattage	Shape	Tolerance	Value

Resistor Type	Wattage	Tolerance
ERD : Carbon	10 : 1/8W	G : ±2%
ERO : Metal Film	12 : 1/2W	J : ±5%
ERX : Metal Film	25 : 1/4W	
ERG : Metal Oxide	1 : 1W	
ERC : Solid	2 : 2W	

ERD10TLJ □□□ → Chip type carbon
ERO10MKG □□□ → Chip type metal film

Numbering System of Capacitor

Example

ECKD	1H	102	Z	F
Type	Voltage	Value	Tolerance	Peculiarity

ECEA	50	M	R47	R
Type	Voltage	Peculiarity	Value	Special use

Capacitor Type	Voltage: ECEA Type	Voltage: Other	Tolerance
ECEA : Electrolytic	OJ : 6.3V	2H : 500V DC	C : ±0.25pF
ECCD : Ceramic	1A : 10V	1 : 100V	J : ±5%
ECKD : Ceramic	1C : 16V		K : ±10%
ECQM : Polyester	1E : 25V		N : ±30%
ECQP : Polypropylene	1H : 50V		Z : +80%, –20%
ECET : Electrolytic	50 : 50V		Y : ±22%
ECEA...N: Non Polar Electrolytic	25 : 25V		
ECBT : Axial Leaded Type Ceramic	MY : 125V AC		
ECQE : Polyester			

Ref. No.		Part No.	Value
RESISTORS			
R1, 2		ERD10TLJ391U	390
R3, 4		ER010MKG2213	221K
R5, 6		ER010MKG5622	56.2K
R7, 8		ERD10TLJ271U	270
R9, 10		ERD10TLJ680U	68
R11, 12		ERD10TLJ184U	180K
R13, 14		ERD10TLJ123U	12K
R15, 16		ERD10TLJ563U	56K
R17, 18		ERD10TLJ102U	1K
R201	S	ERD25TJ104	100K
R202	S	ERD25FJ102	1K
R203	S	ERD25FJ562	5.6K
R204	S	ERD25FJ681	680
R205	S	ERD25FJ102	1K
R206	S	ERD25FJ222	2.2K
R207	S	ERD25FJ562	5.6K
R208	S	ERD25TJ684	680K
R210	S	ERD25FJ470	47
R211	S	ERD25FJ472	4.7K
R212	S	ERD25TJ684	680K
R213	S	ERD25FJ102	1K
R214	S	ERD25TJ684	680K
R215	S	ERD25FJ391	390
R217	S	ERD25FJ331	330
R218	S	ERD25FJ102	1K
R240	S	ERD25FJ472	4.7K
R241	S	ERD25FJ103	10K
R242	S	ERD25TJ104	100K
R243	S	ERD25TJ273	27K
R244	S	ERD25TJ473	47K
R245	S	ERD25FJ272	2.7K
R246	S	ERD25FJ103	10K
R247	S	ERD25TJ333	33K
R248	S	ERD25TJ104	100K
R249	S	ERD25TJ334	330K
R251	S	ERD25FJ561	560
R253	S	ERD25FJ103	10K
R254	S	ERD25TJ124	120K
R255	S	ERD25TJ683	68K
R256	S	ERD25TJ104	100K
R257	S	ERD25FJ222	2.2K
R259	S	ERD25TJ473	47K
R260	S	ERD25FJ103	10K
R261	S	ERD25FJ561	560
R262	S	ERD25FJ151	150
R263	S	ERD25FJ270	27
R264	S	ERD25FJ221	220
R265	S	ERD25FJ121	120
R266	S	ERD25FJ102	1K
R267	S	ERD25FJ271	270
R268	S	ERD25FJ102	1K
R269	S	ERD25FJ682	6.8K
R270	S	ERD25FJ102	1K
R272, 273	S	ERD25FJ101	100
R274	S	ERD25FJ561	560
R276	S	ERD25FJ271	270
R277	S	ERD25TJ473	47K
R278, 279	S	ERD25FJ562	5.6K
R280	S	ERD25TJ564	560K
R301	S	ERD25FJ220	22
R303, 304	S	ERD25TJ223	22K
R305	S	ERD25TJ334	330K
R306	S	ERD25TJ153	15K
R307, 308	S	ERD25FJ332	3.3K
R309, 310	S	ERD25TJ104	100K
R311	S	ERD25TJ223	22K

Ref. No.		Part No.	Value
R401, 402	S	ERD25FJ222	2.2K
R403, 404	S	ERD25FJ331	330
R405, 406	S	ERD25TJ684	680K
R407, 408	S	ERD25TJ473	47K
R409, 410	S	ERD25TJ823	82K
R498, 499 [XL] only		ERD25FJ100	10
R501, 502	S	ERD25FJ222	2.2K
R503, 504	S	ERD25FJ561	560
R505, 506	S	ERD25TJ124	120K
R507, 508	S	ERD25TJ183	18K
R509, 510	S	ERD25FJ222	2.2K
R601, 602	S	ERD25FJ102	1K
R603, 604	S	ERD25TJ393	39K
R605, 606	S	ERD25TJ123	12K
R607, 608	S	ERD25TJ473	47K
R609, 610 ⚠		ERDS1FJ122	1.2K
R611, 612	S	ERD25TJ153	15K
R613, 614 ⚠		ERDS1FJ222	2.2K
R615, 616 ⚠		ERDS1FJ222	2.2K
R617, 618	S	ERX2ANJR22	0.22
R619, 620 ⚠		ERDS1FJ100	10
R621 ⚠		ERDS1FJ101	100
R622	S	ERG1ANJ152	1.5K
R623 ⚠		ERDS1FJ470	47
R625, 626 ⚠		ERDS1FJ331	330
R697 ⚠		ERDS1FJ470	47
R698	S	ERD25FJ103	10K
R699	S	ERD25FJ272	2.7K
R702 ⚠		ERDS1FJ390	39
R703 ⚠		ERDS1FJ102	1K
R704	S	ERG2ANJ391	390
R705	S	ERD25FJ681	680
R707 ⚠		ERDS1FJ152	1.5K
R708 ⚠		ERDS1FJ122	1.2K
R709	S	ERD25FJ102	1K
R710 ⚠		ERDS1FJ390	39
R711	S	ERD25FJ471	470
R712 ⚠		ERDS1FJ6R8	6.8
R715	S	ERD25FJ101	100
R716	S	ERD25FJ221	220
R731	S	ERD25FJ101	100
R801, 802	S	ERD25FJ331	330
R803, 804	S	ERD25TJ153	15K
R805, 806	S	ERD25TJ273	27K
R807	S	ERD25TJ154	150K
R809	S	ERD25TJ393	39K
R810 ⚠		ERDS1FJ330	33
R901	S	ERD25FJ102	1K
R902	S	ERD25FJ561	560
R903	S	ERD25TJ223	22K
R908	S	ERD25FJ220	22
R909, 910	S	ERD25TJ683	68K
R911, 912	S	ERD25TJ124	120K
R913	S	ERD25TJ104	100K
R914	S	ERD25FJ561	560
R918, 919	S	ERD25TJ104	100K
R920	S	ERD25FJ152	1.5K
R930	S	ERD25TJ335	3.3M
R951 [XA,XL] only	S	ERD25TJ124	120K
R952 [XA,XL] only	S	ERD25TJ683	68K

Ref. No.		Part No.	Value
CAPACITORS			
C1, 2	S	ECEA50M3R3R	3.3
C3, 4	S	ECCD1H101K	100P
C5, 6	S	ECKD1H471KB	470P
C7, 8	S	ECQM1H223JZ	0.022
C9, 10	S	ECQM1H682JZ	0.0068
C11, 12 ⚠		ECEA1HN010S	1
C13, 14	S	ECEA1CS330	33
C201		ECBT1C223NYY	0.022
C202	S	ECQM1H473JZ	0.047
C203	S	ECCD1H100KC	10P
C204		ECQP1471JZ	470P
C205	S	ECEA1AS101	100
C206	S	ECEA50Z3R3	3.3
C207	S	ECCD1H180KC	18P
C208, 209		ECBT1C103ZYY	0.01
C210		ECBT1C223NYY	0.022
C211	S	ECEA1HS100	10
C212		ECBT1C103ZYY	0.01
C213	S	ECEA50Z1	1
C214	S	ECKD1H223ZF	0.022
C215		ECBT1H331KBY	330P
C216		ECBT1C223NYY	0.022
C217	S	ECEA50Z1	1
C218	S	ECEA1HS100	10
C230	S	ECQM1H183JZ	0.018
C231	S	ECEA50Z2R2	2.2
C232	S	ECEA50Z1	1
C233	S	ECEA50Z3R3	3.3
C234	S	ECEA50Z2R2	2.2
C235	S	ECEA1ES101	100
C236	S	ECCD1H330K	33P
C237		ECBT1C103ZYY	0.01
C238	S	ECCD1H101K	100P
C239	S	ECCD1H470K	47P
C244	S	ECCD1H080CC	8P
C245		ECBT1C103ZYY	0.01
C246 [XA] only		ECBT1C103ZYY	0.01
C247, 248		ECBT1C103ZYY	0.01
C249	S	ECEA50ZR47	0.47
C251, 252 [XL] only		ECKDHS101MB	100P
C253, 254 [XL] only		ECKDHS102MD	0.001
C299 [EX,EH] only		ECKD1H102ZF	0.001
C301	S	ECEA1CS471	470
C305		ECQP1471JZ	470P
C303	S	ECCD1H470K	47P
C306	S	ECEA50ZR47	0.47
C307	S	ECEA50Z1	1
C308	S	ECQM1H473JZ	0.047
C309, 310	S	ECEA25Z4R7	4.7
C311, 312	S	ECQM1H153JZ	0.015
C401, 402		ECBT1H331KBY	330P
C403	S	ECQM1H333JZ	0.033
C404	S	ECQM1H333JZ	0.033
C501, 502	S	ECQM1H222JZ	0.0022
C503, 504	S	ECQM1H223JZ	0.022
C505, 506	S	ECQM1H183JZ	0.018
C507, 508	S	ECQM1H104JZ	0.1
C601, 602	S	ECCD1H101K	100P
C603, 604	S	ECEA50Z2R2	2.2
C605, 606	S	ECCD1H221K	220P
C607, 608	S	ECEA1HS100	10
C609, 610	S	ECCD1H050CC	5P

Ref. No.		Part No.	Value
C611, 612	S	ECEA1AS470	47
C613, 614	S	ECCD1H220K	22P
C615, 616 ⚠		ECEA1EN100S	10
C618	S	ECQM1H104JZ	0.1
C619	S	ECEA1HS101	100
C621	S	ECQM1H104JZ	0.1
C623, 624	S	ECQM1H104JZ	0.1
C697	S	ECKD1H103ZF	0.01
C699	S	ECEA1HS470	47
C701 ⚠		ECKDKC103PF2	0.01
C702, 703		ECETS42V472U	4700
C704	S	ECKD1H103ZF	0.01
C706	S	ECEA1ES470	47
C707	S	ECKD2H103PE	0.01
[XA,XL] only			
C708	S	ECEA1ES470	47
C709	S	ECKD1H103ZF	0.01
C710	S	ECEA1ES101	100
C711	S	ECEA1ES101	100
C712		ECBT1C103ZYY	0.01
C713 [EX,EH] only		ECQE1104KN	0.1
C801	S	ECEA1HS100	10
C802, 803	S	ECEA50Z3R3	3.3
C804	S	ECEA1ES470	47
C805	S	ECEA1HS101	100
C899 ⚠		ECEA1EN220S	22
C901		ECBT1C103ZYY	0.01
C902	S	ECEA25M4R7R	4.7
C903, 904		ECBT1C103ZYY	0.01
C905	S	ECCD1H180KC	18P
C906	S	ECCD1H150KC	15P
C907	S	ECEA0JS102	1000
C908	S	ECEA0JS102	1000
C909	S	ECEA25Z4R7	4.7
C911	S	ECEA1ES470	47
C912, 913		ECBT1H331KBY	330P
C914, 915		ECBT1H331KBY	330P
C922	S	ECEA1HS100	10
C923, 924		ECBT1C103ZYY	0.01
C951 [XA,XL] only		ECBT1C103ZYY	0.01

■ REPLACEM

Notes:
1. Part numbe
2. Important s
When replac
3. Ⓚ –mark
4. Part other t
5. Bracketed i
6. The "S" ma
7. The parenth

Ref. No.		Part No.
INTEGRATED CIRCUITS		
IC1		SVINJ4559D
IC201		AN7273A
IC301		SVIUPC1161
IC601		SVIK4141–
IC701		SVIUPC781
IC801		AN7072N
IC901		SVID1703C0
IC902		SVIUPB553A
IC903		AN6873N
TRANSISTORS		
Q201	S	2SC1685–Q
Q208		2SD636–R
Q213, 214	S	2SC829–C1
Q215, 217, 218	S	2SC1685–Q
Q216	S	2SA722–S
Q701	S	2SC1685–Q
Q801, 802		2SA992–E
Q901, 902	S	2SC945–Q
Q905~907	S	2SA722–S
Q908, 909	S	2SC1685–Q
Q951 [XA,XL] only	S	2SA722–S
DIODES		
D201		SVDKV1236
D205, 206	S	MA162A
D207		LN846RP
D208 ~ 210		LN446YP
D211, 212	S	MA162A
D213		MA27W–A
D214		LN224RP
D601		SVDMZ3085
D702		SVDMZ303B
D703		MA1160M
D704		SVDMZ314C
D705 ⚠	S	SVDSR1K2
D706, 804		SVDMZ306B
D707		SVDMZ322A
D708		SVDMZ306C
D711~714 ⚠		SVDS2V20
D798	S	MA162A
D799 ⚠	S	SVDSR1K2
D801~803	S	MA162A
D901~905	S	MA162A
D907~914	S	MA162A
D922, 923	S	MA162A
D928	S	MA162A
D951 [XA,XL]	S	MA162A
D952 [EX]	S	MA162A
D961 Except [XA,XL]	S	MA162A
COILS		
L201		SLA2C5–P
L202		SL02C29R–I
L601, 602		SLQY15G–3
FUSES		
F1 [XA] ⚠		XBA2C20TR
F1 [other] ⚠		XBA2C10TR
F2 [XA] ⚠		XBA2C10TR

Capacitor Type	Voltage: ECEA Type	Voltage: Other	Tolerance
ECEA : Electrolytic	OJ : 6.3V	2H : 500V DC	C : ±0.25pF
ECCD : Ceramic	1A : 10V	1 : 100V	J : ±5%
ECKD : Ceramic	1C : 16V		K : ±10%
ECQM : Polyester	1E : 25V		N : ±30%
ECQP : Polypropylene	1H : 50V		Z : +80%, −20%
ECET : Electrolytic	50 : 50V		Y : ±22%
ECEA...N: Non Polar Electrolytic	25 : 25V		
ECBT : Axial Leaded Type Ceramic	MY : 125V AC		
ECQE : Polyester			

o.	Value
222	2.2K
331	330
684	680K
473	47K
323	82K
00	10
222	2.2K
561	560
24	120K
83	18K
222	2.2K
02	1K
393	39K
23	12K
473	47K
22	1.2K
53	15K
22	2.2K
22	2.2K
R22	0.22
00	10
01	100
152	1.5K
70	47
31	330
70	47
03	10K
72	2.7K
90	39
02	1K
391	390
81	680
52	1.5K
22	1.2K
02	1K
90	39
71	470
R8	6.8
01	100
21	220
01	100
31	330
53	15K
73	27K
54	150K
93	39K
30	33
02	1K
61	560
23	22K
20	22
83	68K
24	120K
04	100K
61	560
04	100K
52	1.5K
35	3.3M
24	120K
83	68K

Ref. No.		Part No.	Value
CAPACITORS			
C1, 2	S	ECEA50M3R3R	3.3
C3, 4	S	ECCD1H101K	100P
C5, 6	S	ECKD1H471KB	470P
C7, 8	S	ECQM1H223JZ	0.022
C9, 10	S	ECQM1H682JZ	0.0068
C11, 12	⚠	ECEA1HN010S	1
C13, 14	S	ECEA1CS330	33
C201		ECBT1C223NYY	0.022
C202	S	ECQM1H473JZ	0.047
C203	S	ECCD1H100KC	10P
C204		ECQP1471JZ	470P
C205	S	ECEA1AS101	100
C206	S	ECEA50Z3R3	3.3
C207	S	ECCD1H180KC	18P
C208, 209		ECBT1C103ZYY	0.01
C210		ECBT1C223NYY	0.022
C211	S	ECEA1HS100	10
C212		ECBT1C103ZYY	0.01
C213	S	ECEA50Z1	1
C214	S	ECKD1H223ZF	0.022
C215		ECBT1H331KBY	330P
C216		ECBT1C223NYY	0.022
C217	S	ECEA50Z1	1
C218	S	ECEA1HS100	10
C230	S	ECQM1H183JZ	0.018
C231	S	ECEA50Z2R2	2.2
C232	S	ECEA50Z1	1
C233	S	ECEA50Z3R3	3.3
C234	S	ECEA50Z2R2	2.2
C235	S	ECEA1ES101	100
C236	S	ECCD1H330K	33P
C237		ECBT1C103ZYY	0.01
C238	S	ECCD1H101K	100P
C239	S	ECCD1H470K	47P
C244	S	ECCD1H080CC	8P
C245		ECBT1C103ZYY	0.01
C246		ECBT1C103ZYY	0.01
[XA] only			
C247, 248		ECBT1C103ZYY	0.01
C249	S	ECEA50ZR47	0.47
C251, 252		ECKDHS101MB	100P
[XL] only			
C253, 254		ECKDHS102MD	0.001
[XL] only			
C299		ECKD1H102ZF	0.001
[EX,EH] only			
C301	S	ECEA1CS471	470
C305		ECQP1471JZ	470P
C303	S	ECCD1H470K	47P
C306	S	ECEA50ZR47	0.47
C307	S	ECEA50Z1	1
C308	S	ECQM1H473JZ	0.047
C309, 310	S	ECEA25Z4R7	4.7
C311, 312	S	ECQM1H153JZ	0.015
C401, 402		ECBT1H331KBY	330P
C403	S	ECQM1H333JZ	0.033
C404	S	ECQM1H333JZ	0.033
C501, 502	S	ECQM1H222JZ	0.0022
C503, 504	S	ECQM1H223JZ	0.022
C505, 506	S	ECQM1H183JZ	0.018
C507, 508	S	ECQM1H104JZ	0.1
C601, 602	S	ECCD1H101K	100P
C603, 604	S	ECEA50Z2R2	2.2
C605, 606	S	ECCD1H221K	220P
C607, 608	S	ECEA1HS100	10
C609, 610	S	ECCD1H050CC	5P

Ref. No.		Part No.	Value
C611, 612	S	ECEA1AS470	47
C613, 614	S	ECCD1H220K	22P
C615, 616	⚠	ECEA1EN100S	10
C618	S	ECQM1H104JZ	0.1
C619	S	ECEA1HS101	100
C621	S	ECQM1H104JZ	0.1
C623, 624	S	ECQM1H104JZ	0.1
C697	S	ECKD1H103ZF	0.01
C699	S	ECEA1HS470	47
C701	⚠	ECKDKC103PF2	0.01
C702, 703		ECETS42V472U	4700
C704	S	ECKD1H103ZF	0.01
C706	S	ECEA1ES470	47
C707	S	ECKD2H103PE	0.01
[XA,XL] only			
C708	S	ECEA1ES470	47
C709	S	ECKD1H103ZF	0.01
C710	S	ECEA1ES101	100
C711	S	ECEA1ES101	100
C712		ECBT1C103ZYY	0.01
C713		ECQE1104KN	0.1
[EX,EH] only			
C801	S	ECEA1HS100	10
C802, 803	S	ECEA50Z3R3	3.3
C804	S	ECEA1ES470	47
C805	S	ECEA1HS101	100
C899	⚠	ECEA1EN220S	22
C901		ECBT1C103ZYY	0.01
C902	S	ECEA25M4R7R	4.7
C903, 904		ECBT1C103ZYY	0.01
C905	S	ECCD1H180KC	18P
C906	S	ECCD1H150KC	15P
C907	S	ECEA0JS102	1000
C908	S	ECEA0JS102	1000
C909	S	ECEA25Z4R7	4.7
C911	S	ECEA1ES470	47
C912, 913		ECBT1H331KBY	330P
C914, 915		ECBT1H331KBY	330P
C922	S	ECEA1HS100	10
C923, 924		ECBT1C103ZYY	0.01
C951			
[XA,XL] only		ECBT1C103ZYY	0.01

■ REPLACEMENT PARTS LIST

Notes: 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts order.
2. Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
3. Ⓚ —marked parts are used for black only, while ○ —marked parts are for silver type only.
4. Part other than Ⓚ — and ○—marked are used for both black and silver type.
5. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.
6. The **"S"** mark is service standard parts and may differ from production parts.
7. The parenthesized numbers in the column of description stand for the quantity per set.

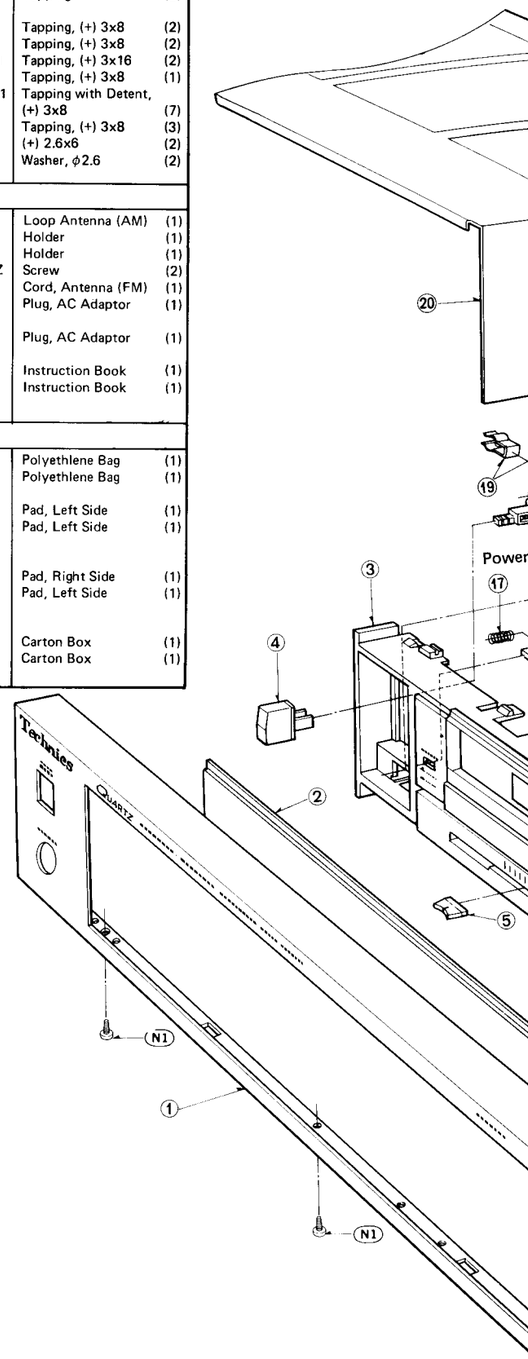
Black type model No. : SA-210 (K)

Ref. No.	Part No.	Description
INTEGRATED CIRCUITS		
IC1	SVINJ4559DDM	Equalizer Amp
IC201	AN7273A	FM IF DET & AM Converter
IC301	SVIUPC1161C3	FM Multiplex
IC601	SVIK4141−2M	2ch. Power Amp
IC701	SVIUPC7812H	Regulator
IC801	AN7072N	Muting & Protection
IC901	SVID1703C018	PLL Controller
IC902	SVIUPB553AC	Pre Scaler
IC903	AN6873N	FL Driver
TRANSISTORS		
Q201 S	2SC1685−Q	AM OSC Buffer
Q208	2SD636−R	Signal Indicator Drive
Q213, 214 S	2SC829−C1	FM IF Amp
Q215, 217, 218 S	2SC1685−Q	Switching & Muting
Q216 S	2SA722−S	Switching
Q701 S	2SC1685−Q	Regulator
Q801, 802	2SA992−E	Over Load Detector
Q901, 902 S	2SC945−Q	Loop Filter
Q905~907 S	2SA722−S	Switching
Q908, 909 S	2SC1685−Q	Buffer
Q951 S	2SA722−S	Switching
[XA,XL] only		
DIODES		
D201	SVDKV1236Z	AM Variable Capacitor
D205, 206 S	MA162A	Switching
D207	LN846RP	LED, Quartz-Lock Ind. Red
D208 ~ 210	LN446YP	LED, Signal Ind. Amber
D211, 212 S	MA162A	Switching
D213	MA27W−A	Detector
D214	LN224RP	LED, Volume Indicator, Red
D601	SVDMZ308B	8V, Zener
D702	SVDMZ303B	3V, Zener
D703	MA1160M	16V, Zener
D704	SVDMZ314C	14V, Zener
D705 S⚠	SVDSR1K2	Rectifier
D706, 804	SVDMZ306B	6V, Zener
D707	SVDMZ322A	22V, Zener
D708	SVDMZ306C1	6V, Zener
D711~714 ⚠	SVDS2V20	Rectifier
D798 S	MA162A	Rectifier
D799 S⚠	SVDSR1K2	Rectifier
D801~803 S	MA162A	Switching
D901~905 S	MA162A	Switching
D907~914 S	MA162A	Switching
D922, 923 S	MA162A	Switching
D928 S	MA162A	Switching
D951 [XA,XL] S	MA162A	Switching
D952 [EX] S	MA162A	Switching
D961 Except [XA,XL] S	MA162A	Switching
COILS		
L201	SLA2C5−P	AM Antenna Coil
L202	SL02C29R−P	AM OSC Coil
L601, 602	SLQY15G−30	Choke Coil
FUSES		
F1 [XA] ⚠	XBA2C20TRO	250V, T2A
F1 [other] ⚠	XBA2C10TRO	250V, T1A
F2 [XA] ⚠	XBA2C10TRO	250V, T1A

Ref. No.	Part No.	Description
TRANSFORMERS		
T201	SLI2C143−M	AM IFT
T202	SLI4C535−Z	FM IF
T203	SLI4C537−Z	FM IF
T701 [XL] ⚠	SLT5M299−W	Power Source
T701 [XA] ⚠	SLT5N405−W	Power Source
T701 [other] ⚠	SLT5M297−W	Power Source
VARIABLE RESISTORS		
VR301	EVN75AA00B53	VCO Adj 5KΩ (B)
VR501	EWE00605A15S	Volume Control, 100KΩ (A)
VR502	EVD00305G15S	Balance Control, 100KΩ (G)
VR503, 504	EWD00205C15S	Tone Control, 100KΩ (C)
VARIABLE CAPACITOR		
CT201	SVCTY121B269	AM Antenna Trimmer
COMPONENT COMBINATIONS		
Z301, 302	EXRP181K473C	180pF, 47KΩ
Z901	EXBP87104M	100KΩ (x7)
FLUORESCENT DISPLAY TUBE		
FL	SAD7MT29ZA	
CRYSTAL		
X901	SVQ43U452−D	4.5MHz
FM FRONT END		
	SNVFE306E05	Front End
CERAMIC FILTERS		
CF201	SVFSFZ450F7L	AM, 450KHz
CF202, 203	SVFE107MS8A	FM, 10.7MHz (Red)
	SVFE107MS8B	FM, 10.67MHz (Blue)
	SVFE107MS8C	FM, 10.73MHz (Orange)
	(Use pair ranks as same as CF202 and CF203)	
SWITCHES		
S1	SSH1083	Band Selector
S5~14	SSG13	Tuning (Up, Down), Memory, FM/AM Preset Tuning
S15	SSH1097	Auto Scan/FM Mode
S16~18	SSH3047	Tape Monitor & Input Selector
S19 ⚠	SSH1071	Power Source
S20 [XA,XL] only	SSS43	AM Allocation Selector
S21 [XA] only ⚠	ESE37219	Voltage Selector

Ref. No.	Part No.	Description & Pcs
CABINET AND CHASSIS PARTS		
1 ○	SGWA210M	Front Panel (1)
1 Ⓚ	SGWA210KE	Front panel (1)
2 ○	SGU319SA	Transparent Plate (1)
2 Ⓚ	SGU319BA	Transparent Plate (1)
3 ○	SGXA210M	Front Sub Panel Ass'y (1)
3 Ⓚ	SGXA210KE	Front Sub Panel Ass'y (1)
4	SBC337−1M	Button, Power Switch (1)
5 ○	SBD69−2M	Knob, Bass, Treble and Balance (3)
5 Ⓚ	SBD69−1M	Knob, Bass, Treble and Balance (3)
6	SBC549−2	Button, Tape (1)
7	SBC547−1	Button, Tuner (1)
8	SBC551−1	Button, Phono (1)
9 ○	SBD71	Knob, Volume (1)
9 Ⓚ	SBD71−1	Knob, Volume (1)
10	SHR9653	Spacer, Volume Knob (1)
11	SBC545	Button (1)
12	SUB139−1	Connection Rod, Input Selector Switch (3)
13	SHR401−1	Lock Pin (1)
14 ○	SGX7475	Ornament, Bass, Treble and Balance (3)
14 Ⓚ	SGX7475−1	Ornament, Bass, Treble and Balance (3)
15	SBZ663−1	Shaft, Knob (Bass, Treble, Balance) (3)
16 ○	SBC483−2	Button, Band Selector (1)
16 Ⓚ	SBC483−4	Button, Band Selector (1)
17	SUS257	Spring, Button (Band Selector) (1)
18	SJJ71E	Jack, Headphone (1)
19	SJT347	Holder, Fuse (2)
20 ○	SKC1190S1	Cabinet (1)
20 Ⓚ	SKC1190BB1	Cabinet (1)
21	SMC1041	Bracket (1)
22 [XL]	SHR131	Bushing, AC Cord (1)
22 [Other]	SHR127	Bushing, AC Cord (1)
23 [XL] ⚠	QFC1207MA	AC Cord (1)
23 [XA] ⚠	SJA111	AC Cord (1)
23 [Other] ⚠	SJA88	AC Cord (1)
24 ⚠ [XA] only	SJS9221	Socket, AC Outlet (1)
25	SJB3005−1	Battery Case (1)
26	SJC7	Terminal, Battery (2)
27	SJC9	Terminal, Battery (2)
28	SGK1569−1	Label, (+) (−) (1)
29	SQK4779	Caution Label (1)
30 [EX]	SGP3490−2A	Rear Panel (1)
30 [EH]	SGP3490−2B	Rear Panel (1)
30 [XL]	SGP3490−4A	Rear Panel (1)
30 [XA]	SGP3490−5A	Rear Panel (1)
31	SJF4431−1	Terminal Board (Speaker) (1)
32	SJF8037−10N	Terminal Board (Input) (1)
33 [XA]	SKUA210X	Bottom Board Ass'y (1)
33 [Other]	SKUA210E	Bottom Board Ass'y (1)
33−1	[SKL245−2]	Foot (4)
34	SHR301	Clamper, lead Wire (2)
SCREWS		
N1 S	XTB3+8BFN	Tapping, (+) 3x8 (3)
N2	XTB3+8BFZ1	Tapping with Detent, (+) 3x8 (3)
N3 S	XTB3+8BFN	Tapping, (+) 3x8 (5)
N4 ○	SNE2095−2	Tapping (2)
N4 Ⓚ	SNE2095−3	Tapping (2)
N5 S	XTB3+8FN	Tapping, (+) 3x8 (2)
N6 S	XTB3+8FZ	Tapping, (+) 3x8 (2)
N7 S	XTB3+16BFN	Tapping, (+) 3x16 (2)
N8 S	XTN3+8B	Tapping, (+) 3x8 (1)
N9	XTBS3+8BFZ1	Tapping with Detent, (+) 3x8 (7)
N10 S	XTB3+8BFN	Tapping, (+) 3x8 (3)
N11 S	XSN26+6BV	(+) 2.6x6 (2)
N12 S	XWA26BFZ	Washer, φ2.6 (2)
ACCESSORIES		
A1	SSA611−1	Loop Antenna (AM) (1)
A2	SMA231	Holder (1)
A3	SMA233−1	Holder (1)
A4	XTN3+10AFZ	Screw (2)
A5	SSA267−1	Cord, Antenna (FM) (1)
A6	SJP5213−1	Plug, AC Adaptor (1)
[XA] only		
A7	SJP5215	Plug, AC Adaptor (1)
A8 [XA]	SQF11549	Instruction Book (1)
A8 [Other]	SQF11713	Instruction Book (1)
PACKING PARTS		
P1 ○	SPP699	Polyethlene Bag (1)
P1 Ⓚ	SPP649	Polyethlene Bag (1)
P2 [XL]	SPS3515−3	Pad, Left Side (1)
P2 [Other]	SPS3515−2	Pad, Left Side (1)
P3 [XL]	SPS3517−3	Pad, Right Side (1)
P3 [Other]	SPS3517−2	Pad, Left Side (1)
P4 [XL]	SPG4289	Carton Box (1)
P4 [Other]	SPG4287	Carton Box (1)

■ EXPLODED VIEWS



Areas

* [EX] is available in Switzerland and Scandinavia.
* [EH] is available in Holland.
* [XA] is available in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
* [XL] is available in Australia.

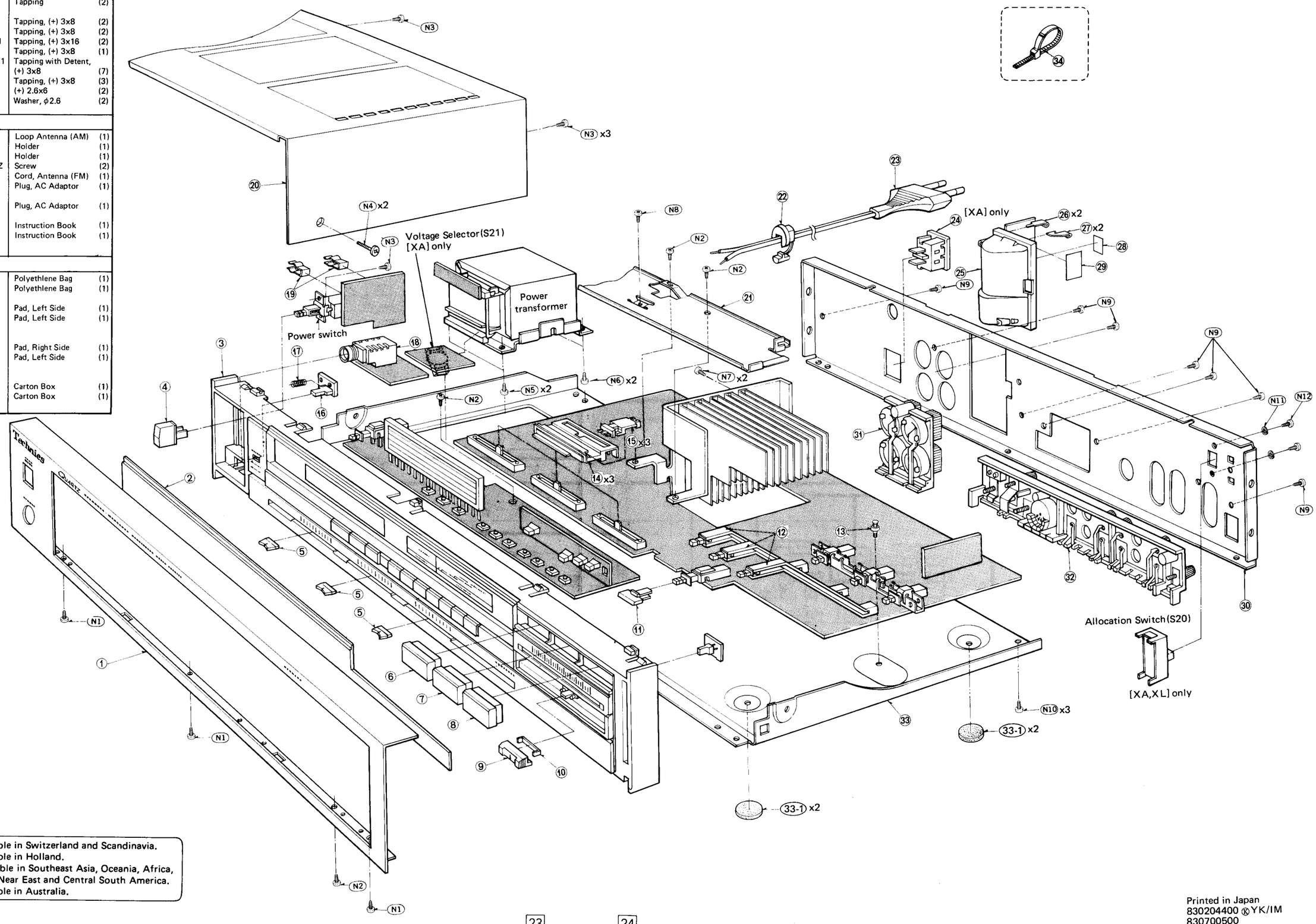
reas.

No. : SA-210 (K)

Description & Pcs	
ont Sub Panel Ass'y	(1)
ont Sub Panel Ass'y	(1)
tton, Power Switch	(1)
ob, Bass, Treble and ance	(3)
ob, Bass, Treble and ance	(3)
tton, Tape	(1)
tton, Tuner	(1)
tton, Phono	(1)
ob, Volume	(1)
ob, Volume	(1)
acer, Volume Knob	(1)
tton	(1)
nnection Rod, Input	
ector Switch	(3)
ck Pin	(1)
nament, Bass, Treble d Balance	(3)
nament, Bass, Treble d Balance	(3)
aft, Knob	
ss, Treble, Balance)	(3)
tton, Band Selector	(1)
tton, Band Selector	(1)
ring, Button	
nd Selector)	(1)
k, Headphone	(1)
lder, Fuse	(2)
binet	(1)
binet	(1)
cket	(1)
shing, AC Cord	(1)
shing, AC Cord	(1)
Cord	(1)
Cord	(1)
Cord	(1)
cket, AC Outlet	(1)
tery Case	(1)
minal, Battery	(2)
minal, Battery	(2)
bel, (+) (–)	(1)
ution Label	(1)
ar Panel	(1)
ar Panel	(1)
ar Panel	(1)
ar Panel	(1)
minal Board eaker)	(1)
minal Board put)	(1)
ttom Board Ass'y	(1)
ttom Board Ass'y	(1)
ot	(4)
mper, lead Wire	(2)
pping, (+) 3x8	(3)
pping with Detent, 3x8	(3)
pping, (+) 3x8	(5)

Ref. No.		Part No.	Description & Pcs	
N4	○	SNE2095–2	Tapping	(2)
N4	Ⓚ	SNE2095–3	Tapping	(2)
N5	S	XTB3+8FN	Tapping, (+) 3x8	(2)
N6	S	XTB3+8FZ	Tapping, (+) 3x8	(2)
N7	S	XTB3+16BFN	Tapping, (+) 3x16	(2)
N8	S	XTN3+8B	Tapping, (+) 3x8	(1)
N9		XTBS3+8BFZ1	Tapping with Detent, (+) 3x8	(7)
N10	S	XTB3+8BFN	Tapping, (+) 3x8	(3)
N11	S	XSN26+6BV	(+) 2.6x6	(2)
N12	S	XWA26BFZ	Washer, ϕ2.6	(2)
ACCESSORIES				
A1		SSA611–1	Loop Antenna (AM)	(1)
A2		SMA231	Holder	(1)
A3		SMA233–1	Holder	(1)
A4		XTN3+10AFZ	Screw	(2)
A5		SSA267–1	Cord, Antenna (FM)	(1)
A6		SJP5213–1	Plug, AC Adaptor	(1)
[XA] only A7		SJP5215	Plug, AC Adaptor	(1)
A8 [XA]		SQF11549	Instruction Book	(1)
A8 [Other]		SQF11713	Instruction Book	(1)
PACKING PARTS				
P1	○	SPP699	Polyethlene Bag	(1)
P1	Ⓚ	SPP649	Polyethlene Bag	(1)
P2 [XL]		SPS3515–3	Pad, Left Side	(1)
P2 [Other]		SPS3515–2	Pad, Left Side	(1)
P3 [XL]		SPS3517–3	Pad, Right Side	(1)
P3 [Other]		SPS3517–2	Pad, Left Side	(1)
P4 [XL]		SPG4289	Carton Box	(1)
P4 [Other]		SPG4287	Carton Box	(1)

■ EXPLODED VIEWS



Areas

* [EX] is available in Switzerland and Scandinavia.
* [EH] is available in Holland.
* [XA] is available in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
* [XL] is available in Australia.

Printed in Japan
830204400 Ⓚ YK/IM
830700500